the windy city:

Harnessing Power in the Neighborhood Landscape

By

Jonathan S. Cherry

BA, Architecture (1999)
Bachelor of Architecture (2001)
Rice University

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Signature of Author: _____
Department of Urban Studies and Planning
May 22, 2008

Certified by: _____
Langley Keyes
Ford Professor of City and Regional Planning
Department of Urban Studies and Planning
Thesis Supervisor

Accepted by: _____
Langley Keyes
Chair, Master in City Planning Committee
Department of Urban Studies and Planning

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Abstract

As wind power has spread in North America, so has an awareness that community acceptance will largely determine whether this renewable energy source continues to grow. Despite apparently widespread popular support for wind energy, a number of proposals for wind farms in rural and offshore locations have been derailed by local concerns. Meanwhile, several towns and cities have begun to explore another possibility: siting wind projects in urban areas.

This thesis provides a framework to help readers compare the stories told about wind power in cities to the experiences in rural or "pristine" locations. It asks: 1) What are the motivations for wind power development in the urban context? 2) Does the community and political response to wind power in towns and cities differ from the experience in rural or offshore settings? To answer these questions, I investigated wind energy projects in Hull (Boston, MA region), Toronto (ON), Palmdale (Los Angeles, CA region), and Lackawanna (Buffalo, NY region).

Based on a review of existing literature on rural wind siting controversies, I anticipated that local opinions about urban wind power would be formed primarily by expectations about the urban skyline and natural landscape, choice of ownership models, and the extent of meaningful community participation in the planning process. I found that while many of the factors highlighted in research on rural wind siting did affect community acceptance in the four cases, the greater social and spatial complexity of the "local" urban environment created new challenges. I conclude that 1) stories about urban wind power's costs and benefits diverged at the neighborhood scale and city scale; 2) the use of degraded and industrial sites helped in siting turbines, but did not guarantee success due to the multiple interpretations of even these sites; 3) "local" ownership did not necessarily quell controversies over siting; and 4) political dynamics that were largely unrelated to the specific projects strongly influenced communities' receptiveness to proposed wind development. I suggest several strategies to help cities plan for urban wind power initiatives at a larger scale that are equitable and provide meaningful environmental and economic benefits.

Thesis Supervisor: Langley Keyes
Ford Professor of City and Regional Planning

Thesis Reader: Judith Layzer
Linde Career Development Associate Professor of Environmental Policy

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Introduction

The wind turbine has become one of the most widely used symbols of the "green" economy. As climate change has recently risen to the top of the list of environmental concerns, politicians, environmental advocates, and corporations have adopted the wind turbine alongside the polar bear as the icon signaling progress against global warming. In early March 2008, presidential candidate Barack Obama visited the new Gamesa wind turbine factory at the former U.S. Steel Fairless Works east of Philadelphia. Surrounded by plant workers and dignitaries, Obama promised "Green jobs are the jobs of the future"[1] and autographed giant wind turbine blades for the media. Three weeks later, Democratic rival Hillary Clinton followed up with a rally at the same plant, promising to "turn this economy around."[2] Not to be outdone, Republican candidate John McCain gave a speech on global warming policy at the Vestas headquarters in Portland—in front of a backdrop of white turbine models and the American flag.[3] Meanwhile, in Panhandle, Texas, a small wind farm built by John Deere has sold its *naming rights*—as well as credit for its renewable energy—to the Steelcase furniture company of Michigan. Eager to burnish its image while reducing its carbon footprint,[4] Steelcase has become the first to apply a trend more common to professional football stadiums or laboratory buildings on college campuses.

Wind power is still a tiny share of the North American electricity market. However, the demand for clean energy in response to state and municipal renewable energy mandates has led to a huge growth in the wind power industry over the past several years—and corresponding financial returns to local landowners and host communities. Even as wind power has come to symbolize environmental correctness, neighbors of wind "farms" have objected to many promising windswept locations, citing concerns about scenic impacts, insufficiently inclusive planning processes, and corporate ownership. Wind energy proposals for agricultural land in New York, the Florida shoreline, the ocean waters of Massachusetts, and on ridgelines from Oregon to North Carolina have encountered stiff local opposition. That opposition has led some developers to propose wind power facilities that are far out to sea or distant from population centers, but others have adopted another strategy.

Locating wind energy production in cities could alleviate many scenic concerns, offer financial and other benefits to urban communities, and reduce transmission losses by

moving power generation closer to its end users. Until recently, cities had not been considered fertile ground for wind energy production because of their complex air streams and limited vacant land. Since 2002, however, local communities, city governments, and private developers have successfully built wind energy facilities in a handful of North American cities. Political leaders and advocates in other cities—including the Mayor of Boston and a coalition of political and business leaders in Cleveland—support the idea of large-scale urban wind power. What are the motivations for wind power development in the urban context? Does community and political acceptance of wind power in towns and cities differ from the experience in rural or offshore settings?

Technical, economic, and legal feasibility will influence whether wind power takes root in any city. The experience of rural energy development in recent years, however, suggests that wind power implementation will largely depend on social, political, and psychological factors that affect local acceptance of specific wind power proposals.[5] Based on a review of existing literature on rural wind siting controversies, I anticipated that community opinions about urban wind power proposals would be formed primarily by three factors: 1) the character of selected sites and the impact of projects on the urban skyline and landscape, 2) the choice of ownership models and degree of local project ownership, and 3) the extent of meaningful community participation in planning processes and site selection.

I then tell the stories of wind energy projects in four North American cities. The case studies include most of the large-scale urban wind energy initiatives that have been undertaken in North America to date: the Hull municipal wind project in Boston Harbor, the cooperatively built Exhibition Place turbine in Toronto, the Palmdale Water District's wind turbine at the base of the San Gabriel Mountains north of Los Angeles, and the privately developed Steel Winds project at the former Bethlehem Steel plant near Buffalo, NY.[6] The projects vary in their ownership models, levels of community participation in planning, and physical settings. These cases expand the current understanding of wind power siting by exploring the physical obstacles to, as well as the opportunities for, wind power in the urban fabric. The cases also demonstrate both the social complexity and mobilizing potential of existing urban neighborhood and organizational networks.

I gathered much of the data through 22 semi-structured interviews, either on-site or by telephone, between January and April 2008. Interviewees included project developers,

wind power advocates, government officials, public board members, leaders of community and environmental groups, representatives of electric utility companies, and neighboring homeowners. In addition to these interviews (listed at the end of each case study), I conducted several anonymous "person-on-the-street" interviews with residents that I encountered. I also gathered archival information about the development process in each city from newspaper articles, public meeting minutes, project feasibility and environmental studies, websites of the cities and developers, and other public records.

After presenting the cases, I analyze similarities and differences among them, and explain how barriers and opportunities found in the urban experiences differ from what would be expected in rural areas (based on the literature review). I find that 1) while many of the factors highlighted in research on rural wind siting did affect community acceptance in the four cases, the social and spatial complexity of the "local" urban environment created diverging stories about urban wind power's costs and benefits at the city scale and the neighborhood scale; 2) although the use of contaminated and industrial sites tended to facilitate wind turbine siting, neighborhood and city-level observers often had contrasting views of even these sites; 3) "local" ownership did not automatically translate into community and political acceptance because financial benefits did not necessarily reach neighborhood residents or city governments; and 4) political dynamics and development battles that were largely unrelated to the specific projects strongly influenced communities' receptiveness to proposed wind development.

I conclude that the ability of urban wind power proponents to build upon the success of initial efforts will be tied to the social and political legacy that these first projects left behind. Based on the dynamics of the individual projects presented here, I portray the development of wind power in these cities as an incomplete political process, rather than as an assessment of purely historical events. I offer suggestions to help cities implement equitable urban wind power initiatives at a more significant scale.

An Evolving Understanding of Wind Power Landscapes

Twenty years ago, as an earlier generation of wind power took hold, Robert Thayer and Heather Hansen of UC Davis explored how "the public" would assign meaning to a new,

highly visible technology in the landscape. Writing in California, where 90 percent of the world's total wind energy was produced at the time, Thayer and Hansen suggested that surrounding communities' perceptions of wind power would not be based strictly on aesthetic assessments of the turbines themselves. Instead, their studies of several California communities suggested three "levels of visual significance" that jointly influence opinions about wind farms. On an abstract level, people might see wind turbines as "moving visual forms…abstract sculptures arousing interest with their novel, unfamiliar forms and animation." Second, turbines might be regarded as intrusive agents of "landscape change" that act as "disturbances to the expected pastoral land uses." Third, wind farms could be symbolic of higher concepts, including "stewardship," "renewable energy," "futurism," "industry," "tax shelter" or "ugly technology." Thayer and Hansen also suggested that local public ownership, planning participation, and financial compensation might change "the entire visual meaning" of wind power landscapes. They proposed two "diametrically opposed hypotheses" about how wind power would eventually be received:

> First, the public might see windpower landscapes as symbolic of responsible stewardship, reading into windpower's straightforward visual character a kind of morally and ethically beneficial quality in stark contrast to the sinister aura of nuclear plants and pollution-belching fossil-fuel alternatives…On the other hand, windfarms might be construed by the public as yet another 'ugly,' unwanted technology in the pastoral landscape, continuing a tradition of 'landscape guilt' and perpetuating its 200-year-old struggle between technology and nature for supremacy in American public policy.[7]

Approximately 15 years after Thayer and Hansen's studies, the wind power industry began a second generation of expansion in the United States, as well as in Europe. Yet, despite high levels of support for wind power in every country as measured by opinion polls, individual wind power projects have faced widely varying levels of welcome from their new neighbors. In many cases, communities have promoted and embraced wind power projects for their economic or environmental value. At other times and in other places, locals have waged vigorous campaigns against the despoliation of the landscape by wind power developers. Across the United States, advocacy groups have formed to combat individual wind energy projects. Several, including National Wind Watch and the Industrial Wind Action Group, have also used the power of the internet to coordinate wider ongoing information campaigns against the proliferation of "industrial" wind power.

Where local communities have raised objections to wind power projects, they have frequently feared local environmental damage due to turbine construction or operation. Many objections, however, involve a deeper sense of lost control over the landscape. Some echo Thayer and Hansen's comments about the "intrusive" aspect of wind power, citing visual impact, noise, reduced property values, safety threats, loss of local landscape character, and impacts on birds. Other objections operate on Thayer and Hansen's "symbolic" level, in which wind power is depicted as a technologically ineffective, high-cost industrial intrusion that benefits distant companies with the help of tax breaks and government subsidies.

It is tempting to label opposition to wind power a knee-jerk Not-In-My-Backyard (NIMBY) reaction. In fact, the "intrusive" objections raised by wind power opponents are strikingly similar to the arguments raised in the frequently described "NIMBY Syndrome." As described by Michael Dear in 1992, the three arguments common to most development battles are concerns over property values, safety, and neighborhood amenity.[8] However, like some other so-called NIMBY reactions, local fights against wind power projects are not necessarily "selfish," but are often rooted in a deep concern about values of place, landscape, and democracy. Community reactions to wind turbines as "landscape change" operate on an individual as well as societal level.[9] On an individual level, we form strong mental connections to places as the "locus of memories,"[10] and changes to our environment may fundamentally affect our personal sense of identity.[11] The discomfort we feel with disruptions in familiar landscapes is compounded on a societal level by what Thayer calls "landscape guilt"—our collective regret about human technological impacts on the landscape.[12] A number of European observers argue that the "NIMBY" label, when applied to local wind farm opponents, is generally imprecise, misleading, and unsupported by empirical research.[13] Maarten Wolsink argues that "NIMBY" opponents to wind farms are in most cases reacting to top-down siting processes that fail to value either local participation in planning or the complex and "highly culturally determined" landscape values of local communities.[14]

In the twenty years since Thayer and Hansen's studies, wind power researchers have proposed and explored dozens of "factors" specific to individual wind power proposals, in an attempt to identify the characteristics that make a project more or less likely to prompt local opposition. A fairly comprehensive list of these factors is shown in Table 1, which builds

		FACTORS IN LOCAL ACCEPTANCE	Cited in:
Project and Site Characteristics	Visual impact of project	Number of turbines	Jobert (2007)
		Project Design/Layout	Jobert (2007)
		Turbine size and color	Devine-Wright (2005)
		Movement of blades: Sense of effectiveness and maintenance	Thayer & Hansen (1988); Righter (2002)
	Perception / use of site	Type of Landscape	Wolsink (2007)
		Ownership of the land. Public or private?	Jobert (2007)
		Will project affect current activities? "USE VALUE"	Van der Horst (2007); Jobert (2007)
		Perception of site "NON-USE VALUE"	Van der Horst (2007); Jobert (2007)
	Location of site	Proximity to neighbors	Wustenhagen, Wolsink, & Burer (2007)
		"Annoyance factors": noise, shadow flicker	Wolsink (2007)
		Bird considerations	
"Programmatic Considerations"	Financial benefit ("Distributional justice")	Direct financial participation of local community members	Wolsink (2007); Maruyama (2007)
		Community/public ownership	Thayer & Hansen (1988)
		Local integration of the developer / Sense of local benefit	Jobert (2007)
	Control of planning and decision-making process	Quality of communication with the public	Jobert (2007)
		Public Participation in planning / Collaborative decisionmaking	Thayer & Hansen (1988), Breukers & Wolsink (2007)
		Fairness and "procedural justice" in planning	Gross (2007)
		Trust in project proponents / Reputation of developer	Wustenhagen, Wolsink, & Burer (2007); Dear (1992)
		Creation of a local "network of support"	Jobert (2007)
"Host Community Characteristics"	Community characteristics	Local economy	Jobert (2007)
		Community self-image	Van der Horst (2007)
		Community Homogeneity and Income	Dear (1992)
	Community experience	Experience/knowledge of wind power or wind power projects	Jobert (2007)
		"Social influence processes": social networks, media, and friends	Devine-Wright (2005)
		Neighborhood "saturation"	Dear (1992)

Table 1

upon recent literature reviews compiled by other authors.[15] As suggested by Thayer and Hansen, different factors surely mix together to form complete opinions. Yet as some have pointed out, few authors have acknowledged these interconnections.[16]

From the long list in Table 1, three factors are cited most frequently. First, a number of researchers have identified the "type of landscape" of the site as the most important variable. Wolsink argues that sites associated with greater natural, cultural, and scenic value will predictably lead to stronger feelings of local opposition than any other factors.[17] Van Der Horst uses the language of environmental economists to combine considerations of landscape with wider community characteristics. He contends that landscape character can be evaluated according to a site's combined "use value" (accessibility) and "non-use value" ("derived from knowledge or awareness about the mere existence of a place"). He speculates that while relatively affluent exurban commuters might be extremely resistant to renewable energy plants intruding on their "rural idyll," residents of post-industrial and "stigmatized" places are likely to be much more welcoming, which "raises questions of environmental equity."[18] Second, many advocates of community-owned wind power have pointed to the long Danish history with wind energy, where communities have been strongly supportive of small projects that are locally owned, while less supportive of larger projects owned by private utilities.[19] Third, the effect of local control and public participation in the wind energy planning process has also been repeatedly—if inconclusively—examined since Thayer and Hansen's research.

The analyses summarized in Table 1 are based on studies of rural wind power siting controversies; few studies have focused on community acceptance of wind power in urban areas.[20] Introducing wind power in cities would seem to avoid some concerns found in rural areas while exacerbating other issues. From the outset, my working hypothesis was that despite the complexity and frequent turbulence of urban wind behavior, the cluttered, modified nature of the urban landscape would make wind turbines more acceptable than at the "pristine" sites in many rural locations. Given the excitement about the "green" city in many quarters, as well as the concentration of financial resources in cities, urban areas might be even more fertile ground for wind power than rural areas. Where urban wind power advocates absorbed lessons from rural renewable energy experiences, I assumed projects would meet much greater levels of local acceptance. I felt that projects that looked beyond a single-minded focus on technical and economic feasibility to prioritize 1) degraded sites

where wind turbines would not negatively impact the urban skyline or sensitive historic areas, 2) local ownership and local economic benefits, and 3) a planning process that fostered local control, could generate excitement about renewable energy in cities.

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[1] Sokolove, Michael. "Change Makes a Call on Levittown." *New York Times*. April 6, 2008.

[2] Eichel, Larry. "Clinton Back in Pa., Focusing on Economy." *Philadelphia Inquirer*. April 1, 2008.

[3] "McCain Talks Global Warming in Portland." Transcript of Speech, May 12, 2008. *The Oregonian*. Downloaded from <oregonlive.com>

[4] Deutsch, Claudia. "Corporate Sponsorship for a Wind Farm." *New York Times*. March 18, 2008.

[5] Lovins, Amory B., et al. *Small is Profitable: The Hidden Economic Benefits of Making Electrical Resources the Right Size*. Snowmass: Rocky Mountain Institute, 2002. Page 45.

[6] There are at least three other North American cities with prominent wind turbines. Boston is home to the 100kW IBEW turbine in Dorchester (2005), as well as the new 650kW turbine at Forbes Lofts in Chelsea (2008). Cleveland boasts a 225kW wind turbine in the center of a landscaped park at the Great Lakes Science Center on Lake Erie (2006). However, two of these are comparatively small turbines, built primarily for public awareness and education, and the turbine in Chelsea is not yet operational at the time of this writing. A third city, Atlantic City, has been home to five large 1.5MW turbines at its wastewater treatment plant since 2005, and an expanded study would ideally include this project as well.

[7] Thayer, Robert Jr. and Heather Hansen. "Wind on the Land." *Landscape Architecture*. Vol. 78, No. 2, March 1988., p. 68-73.

[8] Dear, Michael. "Understanding and Overcoming the NIMBY Syndrome." *Journal of the American Planning Association*. Summer 1992. Page 290.

[9] Righter, Robert W. "Exoskeletal Outer-Space Creations." *Wind Power in View: Energy Landscapes in a Crowded World*. San Diego: Academic Press, 2002. Martin J. Pasqualetti, Paul Gipe, and Robert W. Righter, eds.

[10] Tuan, Yi-Fu. *Topophilia: A Study of Environmental Perception, Attitudes, and Values.* New York: Columbia University Press, 1990. Page 93.

[11] Wester-Herber, Misse. "Underlying Concerns in Land-Use Conflicts: The Role of Place-Identity in Risk Perception." *Environmental Science and Policy*. Vol. 7. 2004. Page 109-116.

[12] Cited in Righter 2002. Page 29.

[13] Three authors who take this position are: Devine-Wright, Patrick. "Beyond NIMBYism: towards an Integrated Framework for Understanding Public Perceptions of Wind Energy." *Wind Energy*. 2005, Vol. 8, no. 2, p. 125-140.; Wolsink, Maarten. "Planning of renewables schemes: Deliberative and fair decision-making on landscape issues instead of reproachful accusations of non-cooperation." *Energy Policy.* Kidlington: May 2007. Vol. 35, Iss. 5; p. 2692.; Van der Horst, Dan. "NIMBY or not? Exploring the relevance of location and the politics of voiced opinions in renewable energy siting controversies." *Energy Policy.* Kidlington: May 2007. Vol. 35, Iss. 5; p. 2705.

[14] Wolsink. 2007.

[15] Literature reviews appear in three recent articles: Jobert, Arthur, P. LaBorgne, and S. Mimler. "Local acceptance of wind energy: Factors of success identified in French and German case studies." *Energy Policy.* Kidlington: May 2007. Vol. 35, Iss. 5; p. 2751.; Wüstenhagen, Rolf, Martin Wolsink, and Mary Jean Bürer. "Social acceptance of renewable energy innovation: An introduction to the concept." *Energy Policy.* Kidlington: May 2007. Vol. 35, Iss. 5; p. 2683.; Devine-Wright. 2005.
I grouped the factors into three overall categories that parallel those used by Dear (1992) in his analysis of NIMBY community attitudes: Project and Site Characteristics, Programmatic Considerations, and Host Community Characteristics.

[16] Devine-Wright. 2005.

[17] Wolsink. 2007.

[18] Van der Horst. 2007. Page 2708-2709.

[19] Nielsen, Frode Birk. "A Formula for Success in Denmark." *Wind Power in View: Energy Landscapes in a Crowded World*. San Diego: Academic Press, 2002. Martin J. Pasqualetti, Paul Gipe, and Robert W. Righter, eds.

[20] Devine-Wright. 2005.

HULL: "A Public Power Community"

Figure A: Hull Wind Two with the Weir River in the foreground. Looking over the Nantasket Peninsula, the Town of Hull stretches out to the north.

"I used to go in and pick up these bottles of all-natural stuff my wife wanted." Hull Light Board Chairman Pat Cannon, who has served on the Board since 1983, recalled his exposure to Hull's initial champion of municipally-generated renewable energy. "This guy by the name of Malcolm Brown…he was in town and he ran this health food store. He would be so excited about wind power: 'Wind power is this up-and-coming thing. The Light Board should really do something.' It got to be where every month my wife had me go down there I would dread it because of this guy."[1]

A town of 11,000 residents, Hull occupies a peninsula that juts into the Atlantic Ocean five miles southeast of Boston proper, defining the eastern boundary of Boston Harbor. Lying under the flight path of Logan airport and linked to downtown Boston by twenty-minute MBTA ferry service, Hull maintains just enough separation from the city to

justifiably claim its identity as a slow-paced seaside town. Hull's character and economy since the 19th century have been shaped partly by the summer crowds drawn to its beaches and spectacular ocean views, but in recent years, this natural setting has provided a new addition to the town's image and bottom-line. Growing out of the initial efforts of Brown and a handful of local advocates, two modern wind turbines now tower over the extreme ends of the long, narrow town, converting strong coastal winds into enough electricity for 12% of Hull's needs. Hull's leaders and municipal electric utility have been seriously engaged in plans to make the town 100% wind-powered with a small off-shore wind farm, a prospect that would offer both tangible and symbolic benefits. Inspired by Hull's well-publicized lead, towns up and down the windy coast of Massachusetts have been exploring the viability of similar projects, using Hull's achievements as a model. A variety of factors explain Hull's early adoption of wind power and the strong support that the turbines have received in the community. The most frequently cited reasons are the existence of the town-owned Hull Municipal Light Plant (HMLP), a cadre of committed local wind power champions, and the active participation of the town's citizenry throughout the planning process.[2]

Figure B: Hull Wind One towers over the houses of Pemberton Point.

The town has slowly built on its achievements, each time increasing in scale. The previous existence of a small turbine at the tip of the peninsula led directly to the push for Hull Wind One, which became the first modern wind turbine on the entire Atlantic Coast of the United States in 2001. The popularity of Hull Wind One led to the initiation of the even larger Hull Wind Two. If the town is successful in its current plans for a publicly-owned wind farm, it could own the first offshore wind project in the country as well. Yet the stories of Hull's achievements leave out much of the social and political complexity that was involved

in fitting two towering, futuristic machines into the fabric of a scenic New England town. Despite broad support for HMLP's wind power initiatives by the town's citizens and elected leadership, the gradual expansion of the town's unique wind power experiment has been accompanied by some resistance at the neighborhood level. Hull's citizens have recognized the direct economic benefits of generating local electricity, as well as the pride of being local leaders in renewable energy. However, those living closest to proposed wind turbine sites have at times seen the towering machines as an unwelcome burden, and have fought to prevent disruption to the use and character of neighborhood places.

Public Power: 1997-2001

> *[People] love that they're putting their money where their mouth is…And it's a town like Hull. You know, you've got these well-to-do people in Hingham and Cohasset…but Hull has always been like a working class town. It wasn't a bunch of…big finance folks coming from out of town and saying…'We're gonna do this,' but it was the town saying 'We want to do this.' And the support was enormous.* – Andrew Stern, Citizen Advocates for Renewable Energy

Light Board member Cannon calls himself a townie, a life-long member of the Hull community. Cannon owns an electrical contracting business, and also works part time as the town's wiring inspector. When he speaks to me about the wind power efforts in Hull, he says that "everybody knows I'm deep into it," and it is obvious he has told the same story before. Cannon, like many members of the community, is proud of his town's recent success with renewable energy, but is also proud of the long history of wind power in Hull.

Cannon tells me how the end of the Pemberton area of Hull, at the tip of the peninsula, has been known as "Windmill Point" since the early 1800s. A pair of brothers operated a salt works at the site, using a windmill to pump seawater into vats, which would later be frozen off and used to pack fish. Much later, in the mid-1980s, the site was home to a small wind turbine on an 80-foot lattice-work tower that fed power into the adjacent Hull High School, saving the town

Figure C: Hull, a Public Power Community

almost $70,000 over its lifetime.[3] Though this turbine failed in a storm in 1997, it became the inspiration for a new generation of wind power advocates, including Malcolm Brown.

One of these early advocates was Andrew Stern, an electrical engineer who grew up in nearby Weymouth. Stern visited Pemberton Point with me on a windy morning in early March, and said that when Citizen Advocates for Renewable Energy (C.A.R.E.) started meeting in 1998, it was a "handful of people, and basically led by Malcolm, myself, Malcolm's wife Anne. There [were] a few other folks, some teachers from the Hull High School, we had an architect. A lot of folks came and went, but certainly Malcolm and I saw it through." C.A.R.E., according to Stern, began a conversation around town with the intention to "re-power" Pemberton Point:

> It was a loosely-knit group, focused on kind of taking the pulse of the town, and… advocating wind machines, but at the same time also seeing what the resistance might be. You know, one of the things you have to do is spend a lot of time with the public in this setting, understand, you know, what their wants are, their desires, but also what are they afraid of, what are their fears? Is it 'this thing's going to be ugly'? Is it gonna be, noisy? You know. So we did a lot of that. Didn't get a lot of negative feedback…Initially, a lot of the outreach was just…through the health food store, you know?[4]

Soon, C.A.R.E. presented the wind turbine idea to HMLP. As the town's electric utility, HMLP would operate any new power project, and also had the ability to "squash" the idea at

Figure D: Hull Wind One at Pemberton Point, with Boston's skyline in the background

an early stage, according to Stern. The proposal was well-received by HMLP, and the group approached the Massachusetts Division of Energy Resources to fund a feasibility study from the University of Massachusetts Renewable Energy Research Lab (RERL).[5] According to Cannon, the feasibility study showed the site to be a winner. The wind resource was there, and the Light Plant saw few regulatory restrictions that would stand in its way. "Look, it's 'Windmill Point.' It's town land, we're not governed by zoning laws. We're exempt [as a municipal utility]," Cannon explained. HMLP expected a significant financial benefit from the project, primarily by offsetting outside power purchases.

With HMLP aboard, the next step was to gain support from the Board of Selectmen, as well as the town's citizens. With a Town Meeting form of government, decisions about a wind project in Hull needed to operate within what Hull Light Board member Stephanie Landry refers to as the "triangle" of the Light Plant, the residents, and the Town Manager. A public meeting in June 2000 brought a warm response from attendees,[6] and the Light Board engaged in negotiations with the Town Manager to explain the financial benefits to the town. According to Cannon, "the way we explained it to people was that it powered 240 homes and all the street lights and traffic controls. The Town Manager loved that part, because what we did is, we no longer bill them for the street lights…It was kind of a 'give to get' with the city. I remember him saying it would be a wonderful thing to tell your kids and grandkids, that that's all powered by wind power."

An RFP was issued by the town in January of 2001, and the $700,000 cost of the project was eventually paid to the Vestas Corporation—in cash—out of the town's rate stabilization fund.[7] By December of 2001, Hull Wind One had been installed and began operation, sending wind-powered electrons into the town's electric grid from the "first urban-sited turbine on the North American continent."[8]

Thinking Bigger: 2002 - 2004

> *The site selection basically came down to 'We want to erect a second one at Windmill Point that will be adjacent to the current one.'…That was an easy one… I asked my fellow townspeople to not punish us with a second windmill…Basically, you would make this an industrial wasteland.*– David Carlon, Hull Wind One abutter and chair of the Hull Planning Board

In its first year of operation, the new wind turbine at Pemberton Point saved the Town of Hull in excess of $100,000[9] and brought accolades from around Massachusetts. In 2002, the Light Board began to consider a follow-up project, with broad community excitement—95% of residents, or 475 out of 500 respondents to a HMLP survey that year, said they would support a second turbine.[10] As Light Board member Cannon explained, economies of scale drove the board to consider a much larger machine. "Now that we had the experience, we started thinking bigger. The 1.8MW Vestas turbine is almost triple the output [of Hull Wind One]. So then it came down to siting."

Yet finding somewhere in town to build a second wind turbine—at 330 feet high to the blade tip, nearly 100 feet higher than Hull Wind One—proved to be much more difficult than the Light Board had imagined. Despite the overwhelming support shown in the HMLP survey, neighbors at all four locations under consideration were concerned about noise, safety, harm to birds, disruption of views, and a general sense that they were bearing a local burden whose benefits would be shared by the entire town. As RERL carried out wind testing and feasibility studies in 2003 and 2004, a series of discussions and contentious public meetings led to the gradual elimination of the three most-favored sites: near the first turbine at Pemberton Point, a mile east near the sewage treatment plant in the Stony Beach area, and a quarter-mile further east of that in Mariners Park. All three sites were located on the beak-like east-west peninsula at the northern end of Hull, with ideal exposure to prevailing southwest winds.[11]

In March 2003, the Board of Selectmen allowed HMLP to erect a meteorological tower for two months in Mariners Park,[12] next to the Hull Yacht Club at the base of Point Allerton. Point Allerton, a hill full of grand old homes and even grander views, marks the entrance to Boston Harbor from the Atlantic Ocean. Represented by the Point Allerton Association, many neighbors were reportedly unhappy with the plans for a large new wind turbine in the park. One resident of the hill wrote multiple letters to the Board of Selectmen in the summer of 2003, calling the plan for a second wind turbine "the greatest threat to Hull" and the decision-making process "out of control."[13] By September of 2003, the Light Board had dropped the Mariners Park site from consideration due to community opposition,[14] despite HMLP's offer to maintain the park in exchange for the right to build the turbine.[15] Cannon still speaks of the site with a tinge of regret:

> Now that would have been a pretty cool location…We never really got to the point where the residents of Allerton Hill said 'Oh, no. We don't want this.' But we did have - the Town Manager at the time came out against it…saying there was too much opposition. We really hadn't even heard the opposition yet, but he must have been getting the calls…I met with [the Town Manager] and the [HMLP] manager. He told us, 'I'll support you 100% on the [other sites], but you have to take this off the table.' There was just going to be too much opposition… OK, we've got a site we can still work with. Who cares?

By the beginning of 2004, the Light Board had shifted its focus to the two other sites at the north end of town, but faced vocal neighborhood opposition there as well. The initial thought, Cannon remembers, was to locate Hull Wind Two across the football field from the first turbine, which would provide access to an electrical substation and create a buffer between the machines to avoid wind interference. The Light Board approached the Hull Selectmen and also began holding public discussions. The residents of Pemberton Point, however, felt they were already doing more than their fair share in hosting the first turbine. "Pretty much, a good part of the neighborhood down there came out against it," Cannon continued. "They felt that they already had Hull One, the Coast Guard station, the town landing. It was just a lot for a neighborhood to bite off…They threw some hand grenades at that. People came out of the woodwork." While most citizens of the town supported the project, several engaged in a letter-writing campaign in support of the Pemberton neighbors, citing noise impacts and the potential that ice could fly off the turbine blades during a high school football game.[16]

In April of 2004, the Light Board held a public hearing on the two sites. Dozens of neighbors attended the meeting, presenting the Board with two petitions in opposition to its siting plans.[17] In addition to Pemberton residents, Stony Beach residents also felt that a wind turbine would add to their already disproportionate burden. According to Light Board President Cannon, "The neighbors came out against the sewage plant location…'Look, we already have a sewage plant that stinks—literally—and it would be towering over their homes…So we kind of took that off the table." In the face of the neighborhood objections, the Light Board withdrew its support for its own upcoming Town Meeting article on the sites, though the town's citizens did vote on the issue the following week.[18] Pemberton resident David Carlon, who is also chair of the Hull Planning Board, remembers the Town Meeting: "Finally, they said 'OK. We can't find a site that everyone is happy with, so we'll take it to Town Meeting.' They had one vote, vote up or down, on do we want to pursue the windmill,

and another vote on [where to put it]. That was a very popular Town Meeting. I think it was a full house…I think people in town said 'OK, this is going a little too far with the impact to our neighbors.'"

The negative Town Meeting vote did not dissuade the Light Board, which still perceived strong community-wide support for a second turbine. Though it dropped the Stony Beach location, the Light Board continued discussions regarding windy Pemberton Point, in addition to a new site – the capped landfill at the far end of town. In August of 2004, the Light Board again held a public meeting at which Pemberton neighbors strongly opposed a second turbine in their neighborhood, but at which tentative support was voiced for the landfill location.[19] In Andy Stern's view, the Light Plant eventually went along with the sentiment of the north end of town, which was: "Hey, we like the one we have. We don't want to discourage installing a second one, we just think that—it's a five mile long town—There's gotta be another place."

Put it at the Dump: 2003-2006

> *I wish that it was done in a more thoughtful way… rather than what I think happened, the town just identified the parcels they owned, and that would get wind, and I think they also looked at political expediency. And since this area is already preserved, that meant less people that would fight it at Town Meeting.* – Samantha Woods, Weir River Estuary Committee

The decision to locate a wind turbine on top of the town's closed landfill was a pragmatic one. The project's planners initially were hesitant about the location, both because the wind speeds were lower than further out on the peninsula, and because of the technical challenges of building on the capped and unstable landfill. Given the opposition faced at the preferred sites, however, the focus of HMLP and RERL shifted to determining if the landfill site was "good enough,"[20] rather than technically ideal. Economic projections would eventually show that winds at the site were adequate to make the project viable, but the primary attribute of the landfill site, in RERL's view, was that the town supported the location.

This support, while strong in the town overall, contrasted with initial hesitation among the neighbors of the proposed wind turbine (who expressed concern primarily about noise)

and opposition by many residents of the town of Hingham, directly across the Weir River (who would receive any scenic impacts from the turbine, while sharing none of the economic benefits). Some concern was also raised from within Hull's environmental community about the project's potential adverse impacts on the surrounding protected estuary area, whether by harm to birds or disruption of the landfill. While many in Hull saw the capped landfill as a perfect unused site for a second wind project, to others the landfill occupied a key site within a scenic landscape of protected salt marshes and coastal drumlins. At public meetings in early October 2004, HMLP recognized that it was stirring up past political grievances (on the part of Hingham residents) while also stepping on the toes of the local conservation community.

As the President of the Weir River Watershed Association and a member of the Weir River Estuary Park Commission (consisting of the neighboring towns of Hull, Hingham, and Cohasset), Samantha Woods had a special concern for the planning process that led to the selection of the landfill site. Woods was supportive of a new wind power project in town, but felt that HMLP did not recognize the estuary's state designation as an Area of Critical Environmental Concern. Woods herself also lives in a house at the base of the landfill, and was initially concerned, like many of her neighbors, about the possible safety and quality-of-life impacts of a wind turbine. "It's a unique ecosystem…I like the way [the turbine] looks…but some people don't, and some people might be offended by it, and some people who might like to go out in their canoe and commune with nature, might not like to have a big whirligig in the sky."

The perception of negative impacts on the surrounding natural area was eventually resolved as the Light Board agreed to set aside an annual fund that would pay for projects in the estuary. Light Board member Cannon remembers,

> The process became political. "What are you going to give to me? Last time you gave us the street lights and the traffic signals."…We agreed to give the Weir River Estuary group up to 10%, no more than $20,000 per year of our green certificates…We figured, well, how can we get everyone on board and happy here and make it work for everybody? We got a bird study done, pre and post. We help out the estuary, which will be the front door of the town…So that became important to them…and they realized the turbine would be good for them.

The initial funds were used to renovate the Weir River Estuary Center, a small building near the landfill that is being turned into an education center featuring a variety of green technologies, including its very own residential scale wind turbine. Woods sees the payments as a way of "recycling" money into conservation and environmental education programs that mitigate the turbine's location within the estuary. Few of the landfill's neighbors ultimately decided to vote against the project. "It is actually pretty great," Woods continues. "I mean it took a little while to get used to. When you drive up our street, it's kind of this mammoth thing. But, you know, I really don't notice it anymore [*laughs*]…Most of us that live right next to it, we would probably be the biggest fans…" To Woods, the turbine and the surrounding watershed are now symbolically connected in the fight against global warming: "That marsh we look out on every day is going to be under water soon."

Figure E: From across the Weir River in neighboring Hingham, the turbine on Hull's capped landfill towers over the surrounding landscape.

Solving the concerns of the neighboring residents in Hingham was not so easy. While a new 30-story turbine would be seen above the treetops from many vantage points in Hull, the view from across the Weir River in Hingham would be unobstructed. Hingham residents raised objections primarily about the turbine's impact on their scenic views across the river, but Woods explains that the political history between the two towns might have also played a role: "Certainly in Hingham they didn't want the turbine… There was a lot of lack of trust, I think, from Hingham, to Hull…because that landfill had been a point of contention, before the landfill was capped…There was…a feeling that Hull did not manage the landfill properly."

At a special Town Meeting in mid October 2004, Hull residents overwhelmingly approved the Light Board's proposal to use the landfill site.[21] Woods voted for the project, but saw a disconnect between the motivations of the Light Board and the motivations of many of the town's citizens: "I think that Town Meeting felt like it was something good, something we could control. Obviously we are not saving the world with the turbine, but we are doing our part. But I felt the [Light Board] was selling it based on the economics of it. It

doesn't make sense to me, that if you put in a renewable energy source but don't force people not to run their air conditioners, or to conserve, then we are not really taking anything offline…" Pemberton resident Carlon, who has mixed feelings about the project, recalls extremely strong support around town (on both economic and environmental grounds) compared to just a few years earlier:

> The economy was changing, there was the higher price of gas, the war was raging…There was more of an incentive to do something seen as the right thing…The timing was better…[The second turbine was] a lot bigger, a lot more energy. It had a more meaningful impact. [With the first turbine,] I saved like $5 a year on my bill, like two packs of cigarettes, if you smoke, or a lottery ticket…This one was much more significant. It was a good deal…It wasn't a unanimous vote, but passed by a large margin.

Hingham residents attended the overflow Town Meeting in the middle school, but were forced to sit in the basement, along with a number of Hull voters.[22] Woods recalls the frustration of Hingham residents, who "had no say in it, really. It was up at our Town Meeting. They couldn't speak. There was really no opportunity for them to be involved in the process." A group of Hingham residents (supported by the Hingham Board of Selectmen), who had been threatening legal action to stop the project, eventually petitioned the Massachusetts Environmental Policy Act office to require that Hull perform a full environmental review of the project.[23] By April 2005, the state determined it would not require the review (which supporters in Hull claimed would kill the project due to the added expense and delay),[24] and the turbine was installed on top of the landfill by the spring of 2006.

Woods feels that most people in Hingham have come to like the turbine—or at least accept it—over the past couple of years, but in the months following the project's completion there were certainly hurt feelings. One Hingham resident who was prominent in the petition campaign summed up the feelings at the time: "To them, they just put a windmill on an old dump…To me, they just put an industrial turbine on a fragile estuary."[25] Others in Hingham have been pursuing the idea of a wind project of their own for years,[26] and it remains to be seen how voters there will see a project that might offer them direct financial benefits. Hingham's own Light Plant manager, a supporter of that effort, voiced his concerns in 2006: "What has created quite a lot of angst is the second one in Hull…My guess is [that windmill] will make it a hair harder" for a Hingham wind project.[27]

Running out of Real Estate: Fall 2004 – present

> *The Light Board—I [think] it was before the Town Meeting vote on Hull Two--we had a discussion and took a vote that this Board would not support or pursue more than two turbines on land in Hull…Granted, another Board down the line could reverse that…* – Pat Cannon, Hull Municipal Light Board

Hull has—more or less—learned to live with its two giant mechanical residents.[28] Since Hull Wind Two was built, the Light Board has not received any complaints from neighbors, according to Light Board member Cannon. He compares the wind turbines with other intrusions in Hull's harbor landscape: "We listen to a foghorn all the time, the airplanes, and Boston Light flashing in your windows…stuff that blends into the background over time." Despite lingering doubts by some residents, the wind turbines have become a source of pride in the community, as well as attracting interest from the outside world. According to Cannon, "It definitely put us on the map…which is kind of amazing. There are thousands of them on the west coast. Maybe because we're a little seaside town and we did it on our own." Many town residents speak about the wind turbines with obvious pride, and a bit of friendly competition with surrounding towns. Two men enjoying coffee in Weinberg's Bakery in early March gave an especially good picture of this town rivalry:

> Man on left: *You may have a very, very minute minority against them—And we're laughing at the other towns, too, because we're so far ahead—A lot of credit goes to the people that run the Light Plant, too, and the Town Manager. They've done a good job being ahead. So—*
> Man on right: *I don't think they ever discussed that in Hingham. Or Scituate. Now they can't wait to get on. See—*
> Man on left: *They fought us. Hingham fought us. The section of Bonnie Brier and Rockland Streets fought us. They said—*
> Man on right: *'We'll never let you build.'*
> Man on left: *'We'll never let you build'…We put it up there anyway.*
> Man on right: *… When we were building the windmills… everybody was sayin' 'Oh, they're crazy.' Now [other towns], they're all beggin' to get on it.*

As towns across the coast of Massachusetts scramble for state grants and local permission to measure wind speeds and consider erecting turbines of their own, Hull is moving even further ahead of the curve. The Light Board and the Board of Selectmen hope to improve their economic position even further, and the economies of scale have led to several years of work on a new proposal. With the strong support of most of Hull's citizens at

a spring 2007 Town Meeting,[29] the town accepted a $1.7 million loan from the Massachusetts Technology Collaborative to explore building four massive offshore wind turbines in the Atlantic Ocean. The 15MW project, which would be located in town waters less than two miles east of popular Nantasket Beach, would combine with the existing turbines to equal 100% of the town's annual electricity needs.[30] Although financing for the estimated $35 million project is uncertain, the town has the strong preliminary backing of Massachusetts political leaders, including Secretary of Energy and Environmental Affairs Ian Bowles. Lobstermen initially voiced concern that the project would disturb shellfish beds, but their appeal of the project was withdrawn[31] and no organized opposition is apparent within Hull.

For HMLP and Hull's Selectmen, the lure of an offshore wind energy project is clearly an economic one. Hull's citizens have repeatedly shown themselves to be supportive of the Town's wind power initiatives, and everyone I spoke with expected that an offshore project would win the voters' backing (once technical and economic feasibility are demonstrated). According to Cannon, the motivation for the town's citizens is "cheap power…Cheap green power. There's a good number of people in town that are very environmentally friendly. They just rave about that we are known for cheap green power." Despite this benefit to residents' pocketbooks, however, some of the people I spoke with had a more complex view of the town's wind power effort and its benefits.

For all of the environmental symbolism of wind turbines, does even a town running on 100% renewable electricity have a license to continue its current patterns of energy consumption? Echoing a concern shared about Hull Wind Two by Samantha Woods, Pemberton Point's David Carlon thinks the drive for wind power is motivated too much by short-term economic concerns:

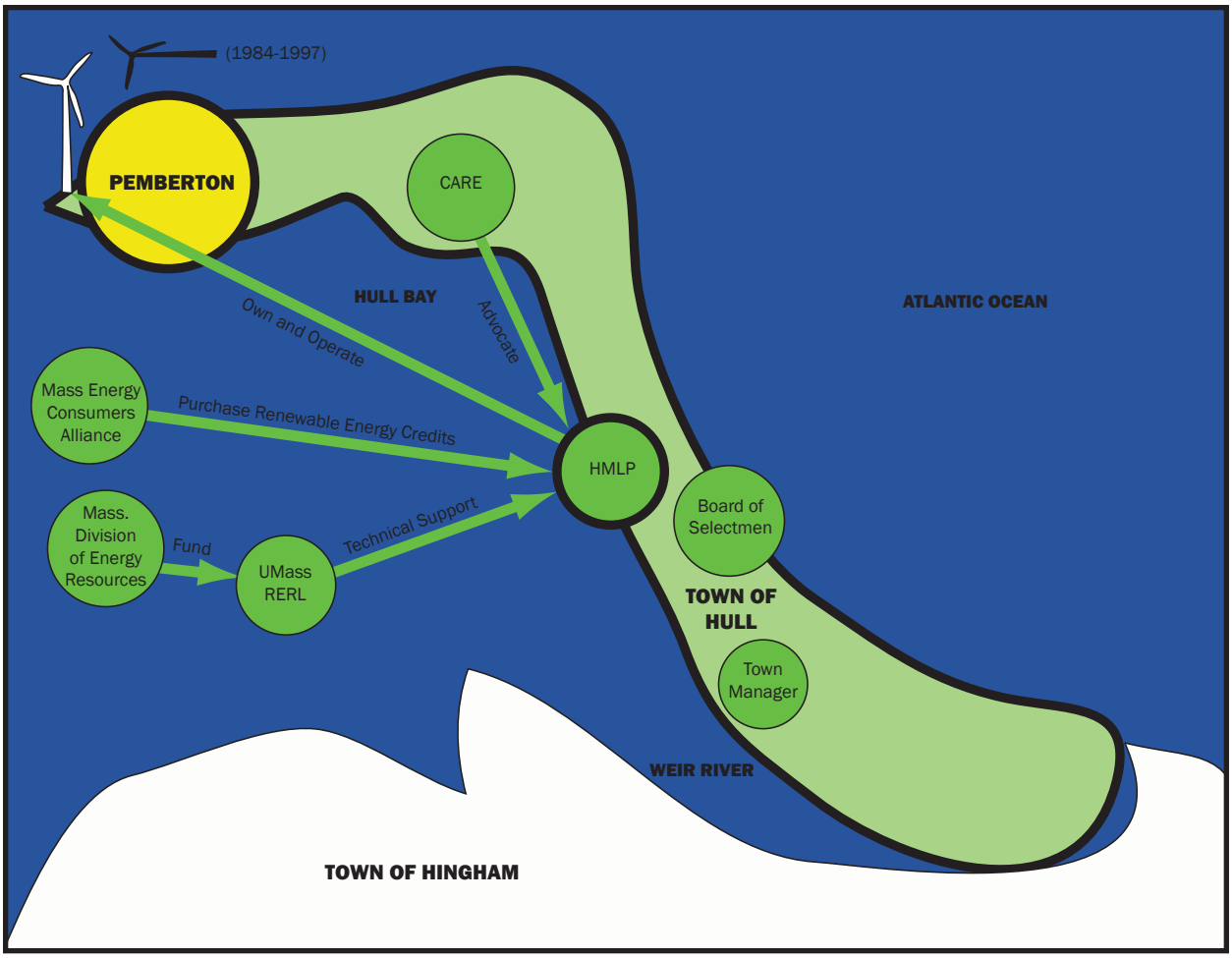
> As I like to call the Light Board, they are a one trick pony …As we move forward on this journey to become a self-sustaining town…we don't have an electric bus, we don't have any other notable energy projects completed, no energy exchange program, no lightbulb program…We're not doing any of those, nothing. It's all about the windmills….The primary factor is economic benefit. It's all about money here. [As a municipal light board,] they are uniquely positioned to have independence in erecting windmills…It's a small town. Talk is cheap. The ability to deliver in a small town is big…It's not just the Light Board.

Light Board member Cannon has heard suggestions before that HMLP "should be doing more than worrying about cheap energy." Yet in his view, "we *are* doing more. We're making

clean energy, making the world a little better without emissions…For every thing we do [outside of] that, it comes out of your pocketbook. Our driving force on the Light Board is to provide as inexpensive as possible and reliable electricity. That's what our charge is…"

A more polarizing issue is one that Hull Wind One abutter Carlon sees already dividing Hull residents based on economic status. Carlon thinks that the offshore windfarm's supporters are minimizing the concerns of beachfront residents: "When I look at that project, I think [the turbines] are going to be very large…This could replace all of our power, it could be free…The notion is great. It is a lofty goal, but it does have ramifications…If there is a prevailing wind blowing, all of that sound…It would have a changing effect on the beach… I am not against that project, it's unique, but it's going to be [an impact]." Carlon was upset earlier this year when he heard the chairman of Hull's Board of Selectmen give a television interview that seemed to discount the opinions of dissenters. In that interview, John Silva said: "People are concerned, I think. Some, legitimately with what it will do with the ocean, with the sea, with nature, but others, I think have some more or less selfish attitudes: 'It will spoil my view, et cetera.'"[32] In Carlon's view, the process of building wind turbines in Hull suffers from a lack of vision:

> Given the economic state of this community, the idea of free electricity is appealing. We are getting into some unusual behavior of people saying 'You have money. You live on the beach. Tough.'…I believe there will be a significant part of town that will object, and it will be the individuals that own million dollar homes on the beach…The simple majority will win out, unfortunately, just because it's free electricity.



Hull, Massachusetts

Planning, Hull Wind One
1997 - 2001

In the spring of 1997, **C.A.R.E.** (Citizen Advocates for Renewable Energy) came together to strategize replacing a **small wind turbine** installed at "Windmill Point" that came down in a severe storm. They eventually approached the **Hull Municipal Light Plant** (HMLP) and convinced its Board of the economic advantage of a new wind turbine.

With the assistance of UMass Amherst's Renewable Energy Research Lab (**RERL**), CARE and HMLP completed a feasibility study and eventually approached the town's citizens at an open meeting in June 2000. With strong public support, Hull funded the project with cash, and the turbine began operation in December 2001.

Strongly supportive of local wind energy project

Mildly supportive of local wind energy project

Mixed feelings about local wind energy project

Mildly negative feelings toward local wind energy project

Strongly negative feelings toward local wind energy project

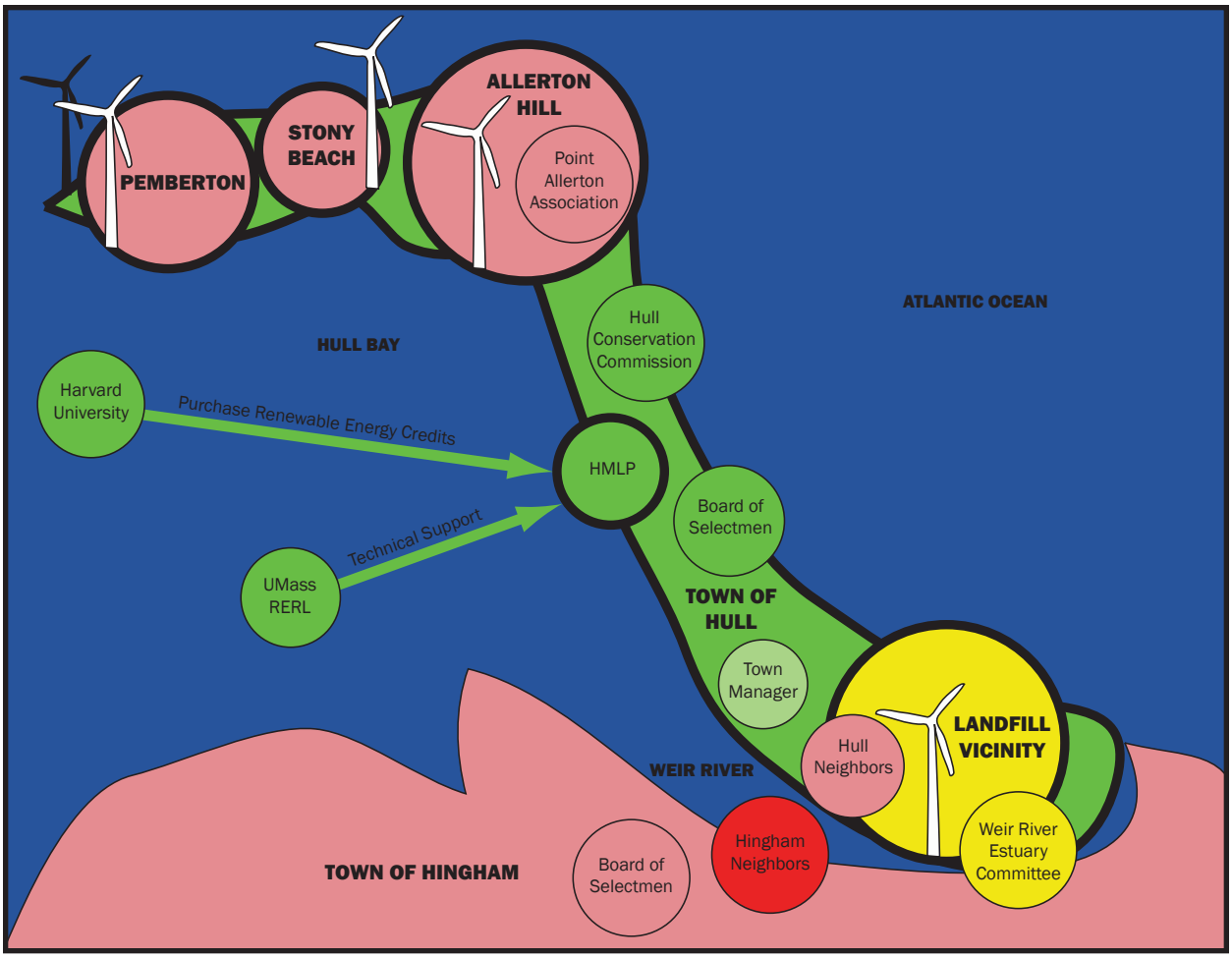
No discernible feelings toward local wind energy project

Member or Contractual relationship

Dispute

Existing wind turbine

Proposed wind turbine

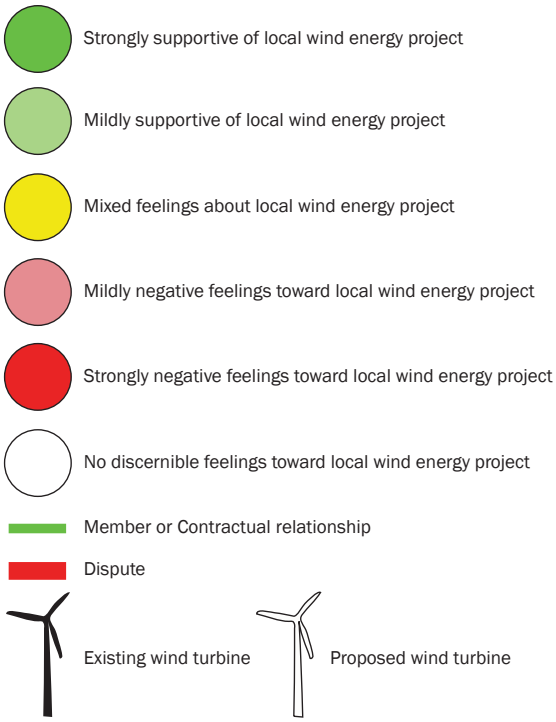


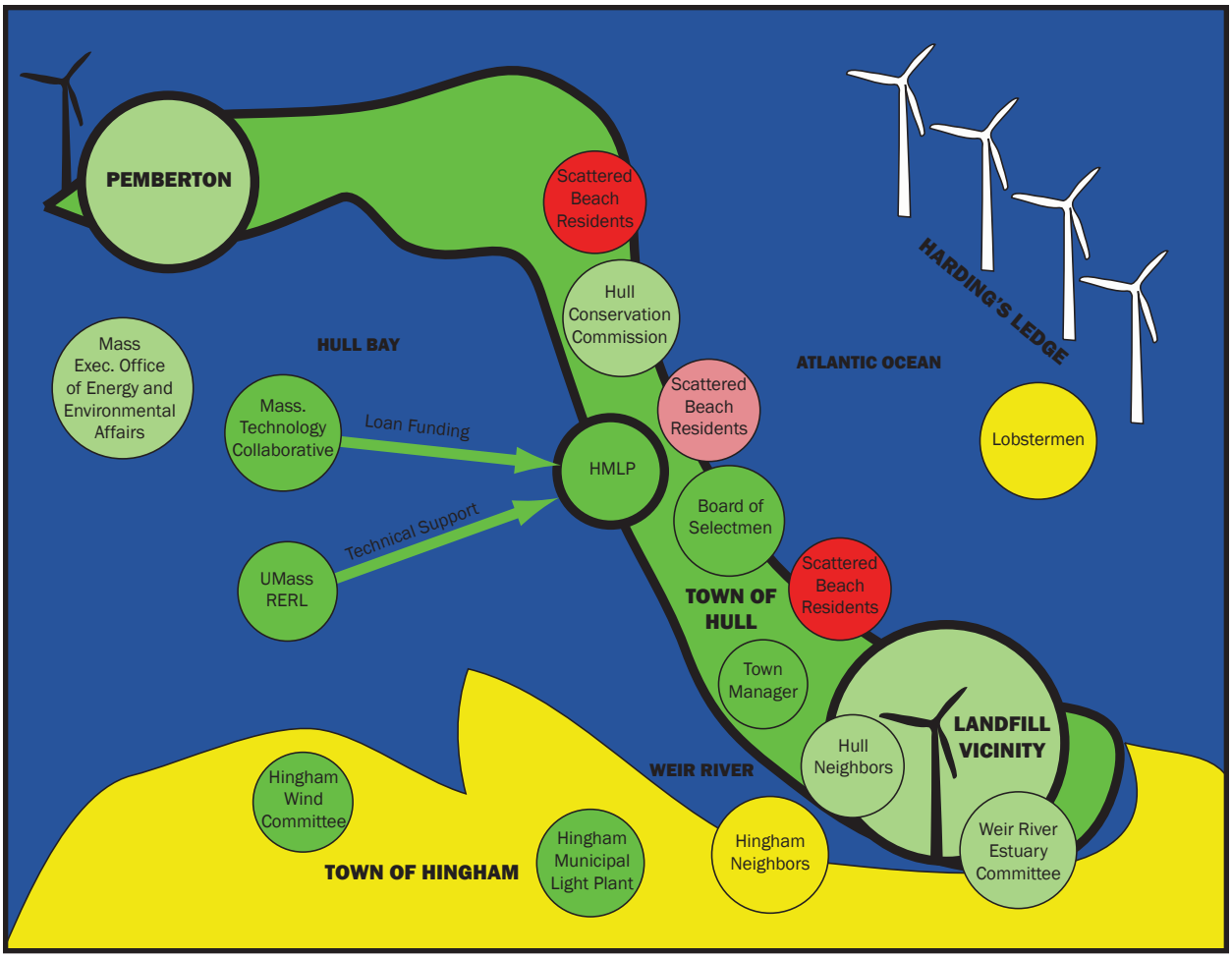
Hull, Massachusetts

Planning, Hull Wind Two
2002 - 2006

With the success of Hull Wind One, the **Light Board** began considering four different sites for a second, larger wind turbine. Neighborhood objections eliminated three of the sites, and the use of the landfill was eventually approved by Hull's voters at **Town Meeting** in the fall of 2004.

Neighbors of the landfill, in Hull and neighboring **Hingham**, raised objections to the new machine. The **Weir River Estuary Committee**, initially concerned with the project's environmental impacts, eventually negotiated a mitigation deal with HMLP. Finally, the project cleared all regulatory and legal hurdles and construction was completed in spring of 2006.





Hull, Massachusetts

Planning, Hull Wind Three

Fall 2004 - Present

The **Light Board** decided to cap land-based turbines in Hull at two. At the same time, the Board, with the support of the **Board of Selectmen**, began planning for an offshore project that could meet the remainder of Hull's electricity needs. The project is still in the planning stage, though some concern has been voiced by **beachfront homeowners** who would receive any visual or noise impacts from the project.

Spurred on by citizens on the **Hingham Wind Committee** and with the leadership of the **Hingham Municipal Light Plant**, neighboring Hingham installed an anemometer on its own landfill in early 2008. Three sites have been identified for a potential land-based wind project.

- Strongly supportive of local wind energy project
- Mildly supportive of local wind energy project
- Mixed feelings about local wind energy project
- Mildly negative feelings toward local wind energy project
- Strongly negative feelings toward local wind energy project
- No discernible feelings toward local wind energy project
- Member or Contractual relationship
- Dispute
- Existing wind turbine
- Proposed wind turbine

Interviews

David Carlon, Abutter of Hull Wind One and Chair, Hull Planning Board
Phone interview, March 13, 2008

Patrick Cannon, Chairman, Hull Municipal Light Board
March 27, 2008 at Dunkin Donuts, Hull

Stephanie Landry, Hull Municipal Light Board
March 4, 2008 at Weinberg's Bakery, Hull

Andrew Stern, Hull Wind
March 4, 2008 in Hull

Samantha Woods, Abutter of Hull Wind Two and President, Weir River Watershed Association
Weir River Estuary Committee
Executive Director, North and South Rivers Watershed Association
Phone interview, March 24, 2008

Figure Sources

A. Courtesy of Hull Municipal Light Plant

B. Photograph by author

C. Photograph by author

D. Photograph by author

E. Photograph by author

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[1] Unless noted otherwise, quotations are taken from interviews listed at the end of each case study.

[2] Manwell, James et al. *Hull Wind II: A Case Study of the Development of a Second Large Wind Turbine Installation in the Town of Hull, MA*. American Wind Energy Conference. June 2006.

[3] Hull Wind website. Downloaded April 1, 2008 from <www.hullwind.org>

[4] The group's focus on building local excitement about wind power was certainly not misplaced. RERL's case study of Hull Wind One (Manwell, et al 2003) describes a 1993 state proposal that would have located two wind turbines at Windmill Point, entirely funded by the Division of Energy Resources. Despite support from HMLP, voters at Town Meeting turned down the proposal, preferring not to work with the "skinny guys in suits" that represented the project.

[5] Manwell, James et al. *Wind Turbine Siting in an Urban Environment: The Hull, MA 660 kW Wind Turbine.* American Wind Energy Association. 2003.

[6] Manwell et al. 2003.

[7] Interview with Andrew Stern.

[8] Manwell et al. 2003.

[9] Estimates of annual savings vary, depending on figures used for the amortization of capital costs and the price of energy. According to RERL (Manwell et al. 2003.), for every kWh of electricity that HMLP produced at 5.3 cents, it could expect to reduce its outside purchases by 8 cents and tack on an extra 4.8 cents through federal incentives and the sale of renewable energy credits: a gain of 7.5 cents per kWh. Using energy

production figures at hullwind.org, the 1,500,000 kWh of first year production resulted in a savings of $112,500.

[10] Shartin, Emily. "Citing Savings, Officials Mull Second Windmill." *Boston Globe*. November 7, 2002.

[11] Among other sites that HMLP considered, Hardings Ledge (1.5 miles east of Hull) was eyed by GE Wind for several months in 2003 as the location for a 3.6MW offshore "research" turbine.

[12] Hull Board of Selectmen. March 18, 2003 Minutes.

[13] Hull Board of Selectmen. July 22, 2003 Minutes.

[14] Hull Board of Selectmen. September 9, 2003 Minutes.

[15] Interview with Pat Cannon.

[16] *Ibid.*

[17] Hull Board of Selectmen. April 27, 2004 Minutes.

[18] Campenella, L.e. "Light Board Backs Off on 2nd Turbine." *Patriot Ledger*. April 28, 2004.

[19] Hull Board of Selectmen. September, 2004 Minutes.

[20] Manwell et al. 2006.

[21] Zaremba, John. "Hull Voters OK 2nd Windmill to Power Homes." *Patriot Ledger*. October 15, 2004. Page 1.

[22] Light Board member Cannon explains that the Board's initial intention was to ask for a paper ballot of Hull's citizens, "because then, neighbor to neighbor, they could vote how they really feel." However, procedural confusion at the meeting resulted in the debate being cut off early, and a successful voice vote was taken instead.

[23] Zaremba, John. "State Could Topple Turbine Proposal." *Patriot Ledger*. February 28, 2005. Page 11.

[24] Zaremba, John. "Windmill may be Turning by Fall." *Patriot Ledger*. April 6, 2005. Page 1.

[25] Lucas, Drake. "What's White, 'Green' and Spins?" *Patriot Ledger*. April 8, 2006. Page 19.

[26] Hingham Wind. <www.hinghamwind.org>

[27] Johnson, Carolyn. "Catching Knots for Watts: As energy costs rise, more towns along the coast look at wind power." *Boston Globe*. May 18, 2006.

[28] Among the tributes to the second wind turbine in Hull, the most unique might be the 20-page illustrated book (*Our Neighbor, Millie)* published by abutter Alyse Clinton, age 8, in 2006.

[29] Ovans, Susan. "Voters Approve $37M Budget, Windmill Plan, Land Purchase." *Hull Times*. May 10, 2007.

[30] Benner, Tom. "Hull Plans Four More Wind Turbines off Nantasket Beach." *Patriot Ledger*. January 15, 2008.

[31] Haraden, Christopher. "Wind Farm Wins Initial OK from State Regulators." *Hull Times*. February 14, 2008.

[32] "Hull, Mass. may be Powered by Wind Turbines by 2009." *New England Cable News*. February 8, 2008. <multimedia.boston.com/pub/m/18415859/hull_mass_may_be_powered_by_wind.htm>

TORONTO: “City within a Park” and “World within a City”

Figure A: Exhibition Place and Lake Shore Boulevard along Lake Ontario

Suite 401 is a beehive of activity. After navigating the art-filled stairs and hallways of 401 Richmond Street West, a converted brick warehouse in downtown Toronto, a visitor enters a shared office space with a long row of cubicles. Among the tenants are four organizations with histories and missions as intertwined as their staff and boards. The Toronto Renewable Energy Cooperative (TREC), the WindShare Cooperative, the Ontario Sustainable Energy Association (OSEA), and the Community Power Fund (CPF) are each dedicated to the twin goals of developing renewable energy and promoting community ownership of those energy projects. The organizations also each grew partly out of a five-year effort to build a wind turbine in the center of Toronto.

The wind turbine on the shore of Lake Ontario at Exhibition Place (ExPlace) produces 750 kW of electricity—enough to power only 250 homes—but has been enthusiastically promoted as a city-wide success story since it began generating power in early 2003. A

highly visible symbol of renewable energy, the turbine is seen by the commuters who zoom by twice daily on the adjacent Gardiner Expressway, as well as by the hundreds of thousands that visit the site each August for the Canadian National Exhibition (CNE). Windshare, the co-developer of the ExPlace turbine, touts it as the first "community-owned" wind turbine in Ontario and (arguably) the first "urban" turbine in North America,[1] and the prominent project has influenced the government of Toronto as well as the course of wider provincial energy policy. Yet, while the idea of wind turbines on the city's waterfront was endorsed by Councillors at City Hall and continues to be held up by Toronto's mayor as an example of the city's environmental leadership, the actual process of locating the wind turbine within Toronto's neighborhood fabric was a lengthy and at times contentious struggle.

To understand that struggle requires understanding the ways that the "environmental" benefits perceived at the scale of city-wide policy-making were translated into "environmental" costs in the arena of neighborhood politics. In a city where political leaders and the overwhelming majority of public opinion favored an innovative "community" initiative, how could a trailblazing, broadly-based cooperative organization and a municipally controlled electric utility be branded as private, outside interests in the center of their home city? What neighborhood dynamics would scuttle promising sites at two existing industrial facilites in the name of protecting public space and the environment? How could a single wind turbine simultaneously influence passage of energy legislation at the provincial government level, yet be brushed off as a marginally useful "demonstration" project by its potential neighbors? Ultimately, in an atmosphere of intense development pressures and existing political dynamics, neighborhood actors at each site reacted to a sense of lost control over the development process, as well as a passionate desire to maintain control over valued community spaces. Today, as the co-developers of the ExPlace turbine pursue their own future wind energy projects in the city, the political dynamics and lessons learned in the process of building this first "demonstration" project will strongly influence future outcomes.

Community Power: 1997-1999

> *The idea originally grew out of power co-op models in Denmark, Germany and the UK…It was the first thing that we looked at in doing a green power co-op in Canada, because there were no North American examples…It was a case of adopting models.* – David Timm, WindShare[2]

As I entered Suite 401 on a warm and sunny morning in early January, Deborah Doncaster launched into a history of the effort to build a wind turbine in Toronto. Doncaster, now the Executive Director of CPF, has been involved in the community energy movement in the city for ten years, since University of Toronto graduate school classmate Bryan Young asked her to conduct an environmental assessment for the wind power project. Young had been working with the North Toronto Green Community, an urban environmental citizens group, in preliminary explorations of a wind power project, and it was clear that perceived harm to wildlife would be an obstacle the group would need to address. Doncaster was working with the Animal Alliance of Canada at the time on avian issues, but quickly became comfortable that a wind power project in Toronto would not be overly harmful to birds. “If it kills birds it is not green technology in my view, and is not appropriate.”[3] Doncaster, who ended up as a project manager for the wind energy effort, felt the issue was “the biggest hoax by the nuclear industry in the UK…such an easy way to undermine a project…Plate glass [kills] many more birds than turbines…It’s a hugely ridiculous issue that drives me insane.”

As it turned out, birds were not the issue that held up the project. Although potential wildlife impacts were aired and addressed throughout the planning process, most naturalist and wildlife groups in the city were won over by the data presented by a well-known ornithologist engaged by the wind power advocates.[4] What Doncaster, Young, and the North Toronto Green Community (NTGC) did not expect was the difficult time they would have finding a physical location in the city for their renewable energy project, despite a high level of popular and political support. “We were really naïve in assuming that because it was a community initiative and a beacon of renewable energy on the waterfront, that people would roll out the red carpet," Doncaster explained. The idealism of the wind power advocates—and their political backers—might have initially blinded them to the challenge of inserting a new type of intervention into the Toronto landscape.

While the initial grassroots organizing around the idea of urban wind turbines came from NTGC, the group was running with an idea first proposed and championed by Dan Leckie (the late Toronto City Councillor and Toronto Hydro board member).[5] The members of NTGC wanted to “create a vehicle for the development of community-based renewable energy in Toronto,”[6] and formed the Toronto Renewable Energy Cooperative (TREC) in early 1998. Anticipating the imminent deregulation of the electricity markets in Ontario, NTGC and

TREC were interested in showing that energy could take the form of "different owners and different technologies" than what Ontario Hydro had been delivering up to that point.[7] There was a sense among TREC's initial members that government and business leaders were acting too slowly to address urban air quality issues and climate change, and that a grassroots approach like the wind power cooperatives prevalent in Denmark could be successful.[8] TREC undertook the task of developing an urban wind power project that would be funded by a large number of $500 investments, and in 1999 established a spin-off cooperative (eventually named WindShare) that would act as the future owner of any wind turbines.

As TREC began seeking wider support for its wind power idea in 1998, it found early supporters in the community and at City Hall. The city's Toronto Atmospheric Fund (TAF) promised an $800,000 line of credit to TREC,[9] and the City Council's Environmental Task Force recommended "expeditious development" of the project to the full Council.[10] The project's key backer on the Council, Jack Layton, was not just the Chair of the Environmental Task Force and the President of TAF, but also Vice Chair of Toronto Hydro, the city's fully owned independent electric utility, and a member of the Toronto Harbour Commission, which would need to approve most of the predicted waterfront sites. Even before the project was widely known in the city, this "very powerful politician"[11] predicted smooth sailing through public processes: "I don't see any difficulty in getting over those hurdles… Someone would have to beat an opposition drum pretty loudly for this to be defeated, and I haven't found anyone doing that."[12]

By the end of that year, the cooperative had started recruiting members, but was in a dire financial situation and close to financial collapse.[13] Fortunately for TREC, in June 1999 a partnership materialized with Toronto Hydro to jointly build and own two turbines on the Toronto waterfront. It was a 50-50 arrangement that benefited both groups. Toronto Hydro, which was interested in building customers for the green power option it hoped to launch upon utility deregulation, saw a community relations upside as well as a chance for a high-profile demonstration of renewable energy. Joyce McLean, now the Director of Strategic Issues at Toronto Hydro, had recently been hired by the corporation to lead its environmental initiatives after a successful career as an environmentalist, including 10 years at Greenpeace Canada. McLean had been an initial member of TREC's board and worked to get Toronto Hydro to support the partnership. As McLean explains, "Having a

community partner like TREC has been enormously beneficial in selling the idea" of wind turbines to the community "because they are…real people with real money on the table and people who could speak from the heart." The partnership clearly benefited the project financially, but Doncaster also feels that just as TREC lent legitimacy to the community process, "Toronto Hydro gave us credibility, from the City's perspective."

Searching for a Site: 1999-2001

> *They came with a holier-than-thou attitude. They came saying "Green power is good for you. We must have it. You should feel lucky we picked your site…I think they were stunned there was any opposition."* – John Carley, Friends of the Spit

Throughout 1999, TREC and Toronto Hydro began community outreach across the city, but focused primarily at sites the developers considered the most feasible for wind turbines. Since the prevailing winds in Toronto come mostly from the southwest, and Toronto runs roughly east-west along the north shore of Lake Ontario, lakefront sites seemed the most promising. A list of 11 sites was eventually culled from a total list of 41 sites, which were evaluated based on a variety of technical factors that included wind access, grid interconnection, airport flight restrictions, and minimum distance from surrounding structures for noise and safety reasons. Eventually, after it prioritized sites that had the highest visibility as well as likelihood of landowner and land use permission, TREC released a list of three preferred sites to the public in late 1999.[14] The first site was adjacent to the city's R.L. Clark water filtration plant, on the Etobicoke waterfront several miles southwest of downtown Toronto (See Figure B). The other preferred sites were clustered just east of downtown, on industrialized lake-filled lands surrounding the city's Ashbridges Bay Sewage Treatment Plant in South Riverdale (See Figure D).

In October 1999, after several months of community meetings attended by the developers, Toronto's City Council took the step of approving "in principle" the use of city land for up to three wind turbines, though the Council instructed the developers to continue pursuing a variety of sites around the city.[15] House-to-house surveys conducted in November and December of 1999 in the Etobicoke and South Riverdale neighborhoods found low levels of objections to the wind project sites from those living in the immediate vicinity. In Etobicoke, 78% of neighbors had no objection when shown a visualization of a wind turbine

adjacent to the filtration plant, and in South Riverdale, 90% of neighbors expressed no opposition to the two sites under consideration near the sewage treatment plant.[16] Despite these indicators of support, a vocal minority of residents in both neighborhoods had begun airing its opposition to the turbine sites.

When TREC and Toronto Hydro approached the Etobicoke community directly with their wind turbine proposal, they initially proposed sites next to the water filtration plant as well as in adjacent Sam Smith Park, a manmade landform that juts into Lake Ontario. While the filtration plant site received some support, the idea of using any part of the park as a location for a wind turbine was swiftly attacked by many of the park's defenders. The Citizens Concerned About the Future of the Etobicoke Waterfront (CCFEW) were the most active neighborhood group opposed to the proposals, taking a position in support of wind turbines on Toronto's waterfront, but just not in this location.[17] The neighborhood groups were supported by Ward 6 City Councillor—and CCFEW member—Irene Jones, who also expressed support for the wind turbines in concept, although opposition to the location.[18] As TREC board member Brian Iler explains, in Toronto, "If the local councilor is not excited, it is pretty hard to get a lease out of the city."

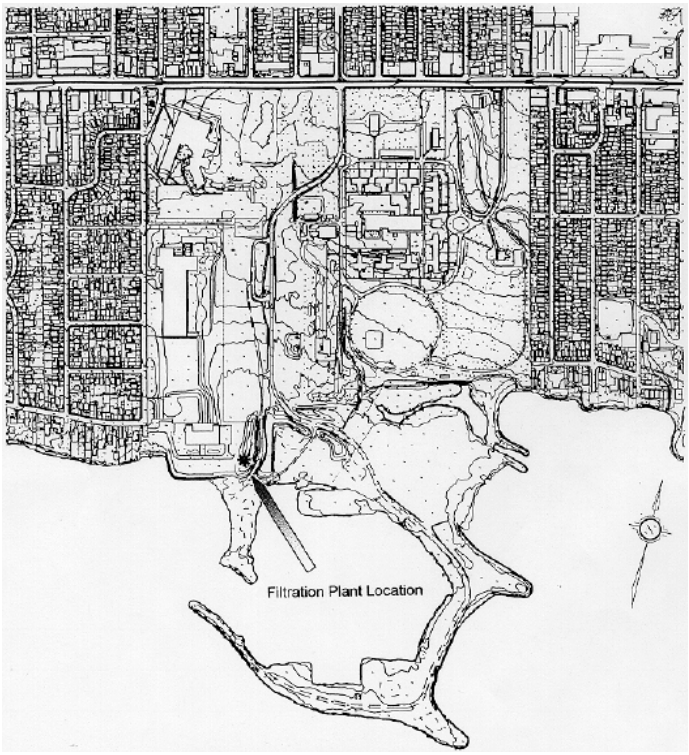


Figure B: R.L. Clark Water Filtration Plant and Sam Smith Park, South Etobicoke

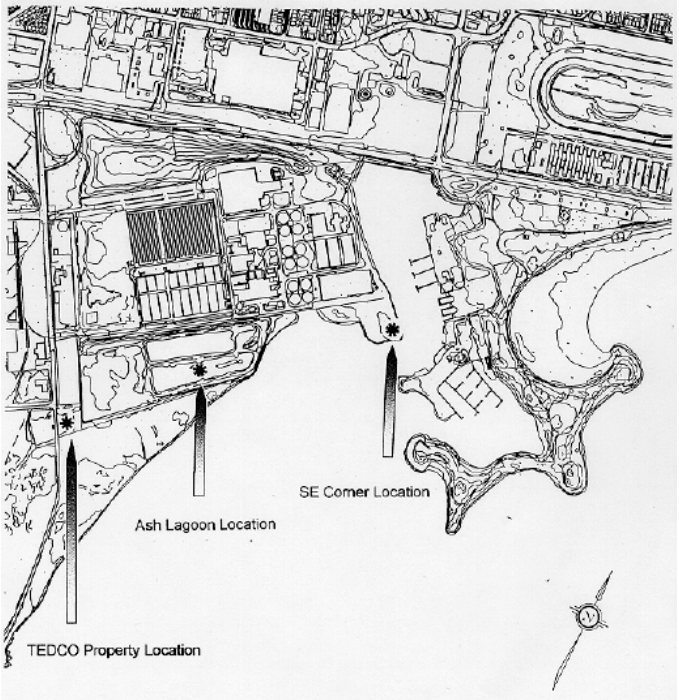
At the first full community meeting in Etobicoke to air the plan, the wind project's supporters were shouted down by angry community members who criticized the developers' plans. An article entitled "Residents Tear Blades off Urban Windmill Plan" featured the opinions of Lakeshore Ratepayers Association president Bob Gullins: "We have worked for 20 years on this park…I have personally spent thousands of my own dollars and hundreds of hours toward this park. The park is perfect the way it is."[19] Toronto Hydro's McLean, who was present at the meeting, says that even the site at the water filtration plant was part of a

"seamless greenspace…You couldn't tell where the [water filtration] plant stopped and the park began." Though discussions would continue for several months in relation to the filtration plant property, the residents' opposition effectively took the site off the table. In McLean's view, while TREC and Toronto Hydro thought a wind turbine would fit in well with the site's industrial character, the park's defenders saw the site differently: "'Oh, my God, this [will be] an industrial facility'…This dealt a death blow to the project…We didn't want to go to a neighborhood that objected."[20]


Figure C: Ashbridges Bay Sewage Treatment Plant, looking west over the Port Lands, with the entrance to the Leslie Street Spit to the left side of the photograph.

Meanwhile, on the east end of town, a wide range of neighborhood actors was engaged in discussions with the wind power developers about a second cluster of three proposed sites adjacent to the South Riverdale and Beaches neighborhoods. To a casual observer like myself, the area at the foot of Leslie Street would best be described as the "industrial fringe," and historically that is the function the area performed. The Ashbridges Bay Sewage Treatment Plant was built in the early 20th century at the heavily polluted base of what was once a massive wetland complex.[21] Subsequent lake-filling in the mid 20th century created the vast port and industrial complex to the west of the site known as the Port Lands, which is now largely abandoned (save for the hulking and decommissioned Hearn generating station, scattered warehouses, small marinas, and storage yards) and targeted by the City for redevelopment. To the south of Ashbridges and the Port Lands stretches the Leslie Street Spit, an artificial 3-mile-long peninsula originally intended as a breakwater for the port.

Each of the three proposed sites near the Ashbridges Plant was opposed by community groups who felt that wind turbines were incompatible with their own plans for the area, and all three sites were in turn opposed at the City Council level by Ward 32 Councillor Sandra Bussin. The "Southeast Corner" location was opposed primarily by the neighboring Ashbridges Bay Yacht Club, which was concerned about noise and safety. Meanwhile, the sewage plant's "Ash Lagoon" location was opposed by multiple groups who had been negotiating with the city over the plant's environmental and neighborhood impacts. These groups included the plant's Implementation and Compliance Monitoring Committee (ICMC) and the Safe Sewage Committee. Karey Shinn, chairwoman of the Safe Sewage Committee, asked Toronto's City Council to save the site for future sewage needs, not for energy production: "Doesn't sewage filling up in people's basements cause more harm than losing some marginal carbon dioxide reduction?...We will need this site."[22]



However, the site with the most vocal defenders was the vacant property at the base of Leslie Street owned by the Toronto Economic Development Corporation (TEDCO). Over the past 40 years, the adjacent Spit has been reclaimed by natural forces, and since 1977 has been adopted by the Friends of the Spit (FOS), a citizen's group of 1,200 members formed to protect this "extraordinary wildlife reserve."[23] John Carley, a self-described "ornithologist and butterfly specialist and architect" who has been co-chair of FOS for "only" 19 years, remembers the debates about locating wind turbines at the Spit as "a very long and at times acrimonious struggle." In Carley's view, the debate over the wind turbines was not a disagreement over renewable energy, but a siting controversy that pitted environmental advocates from TREC against the preservers of a unique "urban public wilderness" from "industrial" intrusion. "We support wind power...It sounded like NIMBY, except none of us live there. It's not our backyard. It's a philosophical thing." To Carley and FOS, the issue was:

"Don't have your green gain at the expense of another green gain…It's like your brother lining up for the Confederacy and you lined up for the Union…You don't eat your own."[24]

As early as 1998, TREC had in fact considered the Spit itself as an ideal location for wind turbines, though dropped the idea due to opposition from FOS (See Figure E).[25] TREC eventually settled upon the TEDCO lot instead, near the sewage treatment plant at the northern access road to the Spit. Along with the sites across town near the water filtration plant in Etobicoke, TREC's Doncaster described the three Ashbridges sites as "infill sites, human-made parks. They are not natural." Yet FOS continued to argue the project posed potential harm to birds, as well as a threat (both strategic and aesthetic) to the Spit itself. Arguing that the Spit and the "baselands" to the north should be considered an integral and complete protected area, Carley saw the wind turbine battle as part of a broader "20-25 year fight to keep the Spit free from development…The land was not their own. It is public. We had fought to keep this land in the public realm. Once land is in the public realm, it should stay in the public realm…The Spit doesn't look like a conventional park, and politicians and developers think it's waiting for something to happen." Carley also questioned whether TREC should be considered a "community" initiative at all: "Ha. TREC *is* a private developer. They are run on a cooperative basis, but are not a 'community group.'" The FOS newsletter in December 1999 demanded that "public lands should not be used for corporate purposes," seeing the project as a "demonstration" with little environmental benefit—though a great benefit in the form of advertising for wind turbine manufacturers.

New plant species? Can you imagine the Spit sprouting hundreds of towers weighing 50,000 pounds, with blades the length of half a football field? Wind turbines help lessen the need for fossil fuels, but the Spit with its critical wildlife corridors and sensitive environment is not a suitable place for such an invasive project.

Figure E: Friends of the Spit newsletter, April 1998

Eventually, FOS, together with the Yacht Club and others, appealed to a higher authority in response to a variance the city granted the turbine project. Carley says that FOS "filed a motion at the Ontario Municipal Board—a quasi judicial body that can overrule local zoning decisions…It is a hated body, but in this case we used them to our benefit… Everything ground to a halt."[26] The site near the yacht club at the southeast corner of the sewage plant was also eventually taken off the table. However, despite the opposition to all

three sites near the Ashbridges Plant, Toronto's City Council remained supportive of the wind project. In July 2000, the Council's Works Committee unanimously recommended that the developers receive approval to construct their first turbine on the sole remaining site, the abandoned ash lagoon south of the sewage treatment plant. Councillor Jack Layton, always optimistic, predicted that "this turbine will capture the imagination of Torontonians…It's a great addition to our waterfront."[27] On August 1, 2000, against the wishes of City Councillor Bussin and the Safe Sewage Committee, Toronto's City Council gave its blessing to the Works Committee's recommendation. From an original list of 41 sites, one site in the City of Toronto seemed to have finally made its way through the gauntlet of public review processes. As the Committee wrote at the time, "The proposal has engendered much support and much opposition from various parties. It appears as though almost everyone supports the concept of the wind turbines being located somewhere but not everyone agrees as to the same 'somewhere'…"[28]

Finding a Loving Home: 2001 - 2003

> *As the local Toronto Councillor, I am writing in support of the Wind Turbine Project at Exhibition Place. This exciting project will generate energy by using environmentally–friendly technology while providing an educational tool for the countless users of this part of Toronto's waterfront*.[29] – Councillor Joe Pantalone, June 11, 2001

As it turned out, the idea of locating a wind turbine at the Ashbridges Bay Sewage Treatment Plant—though approved by the City Council and federal environmental authorities—would eventually die a slow death at the hands of the unresponsive Toronto Port Authority, the federal agency that owned the land beneath the city-operated site. However, as the impasse over the Ashbridges Bay sites dragged on in 2000, the project's promoters turned their attention to an idea floated by their opponents at Etobicoke and Ashbridges: picking a more acceptable location. As Friends of the Spit co-chair John Carley saw it, the grounds of Exhibition Place—a mile west of downtown Toronto - offered a win-win situation for everyone involved. Carley says that Michael Harrison, President of CCFEW, initially suggested the new location, and Friends of the Spit picked up on the idea:

> All of the industrial discoveries were showcased there. [There are] a million people driving by in their gas guzzlers…no habitat concerns…Ed Hale called me up. We went out for a beer—the other co-chair [the late Jacqueline Courval] and I and Ed…We said if this was a

> demonstration project, it should go where the most people would see it…We made the tactical decision to lift the [Ontario Municipal Board] appeal if they pursued the CNE site until all options there were exhausted…We got the politicians on board, our friends on the CNE board…The CNE board approved it.

Although TREC had considered dozens of potential sites over the preceding two years, ExPlace was not high on their list of preferred locations. In early 2000, CCFEW had sent a list of 20 alternate sites to the City of Toronto, but a quick assessment of ExPlace predicted unfavorable wind turbulence from the site's large buildings.[30] However, the persistence of the opponents at the favored sites led TREC to reconsider. At some point, TREC Board Member Brian Iler recalls, "John Carley knew a friend on the board at Exhibition Place and told us: 'You can just move there.' We said, OK, if that ended up being faster, we'll go there." Doncaster, manager of the turbine project for TREC, explained that TREC's objectives were "partially production, partially display" and they eventually agreed to put up an anemometer at ExPlace to test the wind.

Though not as technically favorable as other sites, the idea of locating a turbine at ExPlace gained quick traction and seemed to offer benefits to everyone involved. The site's owner and local city councillors were supportive, and TREC and Toronto Hydro only needed to make small amendments to the Environmental Assessment from the Ashbridges Bay site.[31] The developers made a presentation to the Board of Governors of ExPlace in November 2000, negotiated a lease for a site, and by June of 2001, Toronto's City Council approved the deal.[32] According to WindShare's Iler, "because the city loved it," the building department took a favorable view and classified the innovative project as an "entertainment device" to comply with the site's zoning as a park. ExPlace CEO Dianne Young recalls how smooth the process was:

> TREC [and Toronto Hydro] came to Exhibition Place—we did not seek them out. But to me and to members of the Board of Directors for Exhibition Place there was not any question at all that we would not be the site—in fact I was so surprised that TREC received a negative response from City Parks Department—I would have thought everyone would want this icon on their lands…The surrounding community had some very minor concerns but Joyce [McLean] & TREC came and spoke with the neighbourhood, and the citizens who attended were also okay with everything. It was very easy.

Though it took a year and a half after that for the turbine to be built, the city's political leadership quickly looked to leverage the project's symbolic value. TREC's general manager at the time, Bryan Young, predicted the turbine would "show the kind of leadership

our city has in terms of trying to do something at the municipal level about climate change…And the Ex is a fabulous location because it has the best visibility on the Toronto waterfront."[33] The Toronto Atmospheric Fund (TAF), the city environmental incubator that had provided startup support to TREC under the leadership of Councillor Jack Layton, continued its financial assistance. After awarding the ExPlace project a half million dollar bridge financing loan to purchase the turbine machinery, TAF featured the "showcase" wind turbine in its annual report as its leading achievement in 2002 and 2003: "The turbine is expected to produce enough energy to power 250 households. But more significantly, it gets people thinking about the elegance and feasibility of renewable energy sources and community ownership of energy supply…"[34] Toronto's Mayor, David Miller, a champion of environmental initiatives, has called the turbine "a constant reminder to everyone who sees it of the potential for renewable energy in our city."[35] Layton, who left city office in 2003

Figure F: The former Government of Ontario Building at Exhibition Place, overlooking Lake Ontario

upon his election to leadership of Canada's New Democratic Party, was reportedly inspired by the ExPlace turbine to announce a national initiative in 2004 to build 10,000 wind turbines.[36] Even today, as the leader of Canada's New Democratic Party, Layton features a row of wind turbines as the banner image behind his photograph on his website.[37]

On the ground in Toronto, it does seem that the education touted by TAF and Mayor Miller is taking place. The base of the turbine is open to the public, and features interpretive signs along a boardwalk accessible from surrounding walking paths. In addition to the 1.25 million visitors during the annual CNE,[38] TREC has numerous education programs that introduce school groups to the project and wind energy. As Toronto Hydro's Joyce McLean

emphasized in 2003, "Obviously this isn't going to make a serious dent in the electricity demand in the city of Toronto…But at the same time it gives people some idea of what a wind generator looks like because most people have never seen one. The education component on this is huge."[39]

After just a few months of grassroots fundraising, WindShare had met its target of $800,000[40] in member capital contributions by the second day of construction in December 2002.[41] These 421 members consisted largely of individual households across Toronto who invested primarily at the $500, $1000, and $5000 levels,[42] but also included a smaller amount from corporate investors and one large contribution of $200,000 from an anonymous Montreal foundation.[43] WindShare's cooperative member-investors saw a number of intangible benefits from their investment, even if any potential monetary payback would be years in the future. University of Toronto PhD candidate Fiona Duguid concluded from focus groups with WindShare members that nonmaterial motivations and benefits included a desire for connectivity to the community, a desire to express environmental consciousness, a sense of a politically subversive project "built right under everybody's noses", a desire to leave a legacy for future generations, and pride in ownership of the project.[44]

Looking beyond the city: 2003-2006

TREC decided that putting turbines in Toronto was a nightmare. – Deborah Doncaster

Even as the ExPlace turbine was being built, WindShare members expected more. Membership continued to grow, eventually reaching two hundred and twenty "investors-in-waiting" by the end of 2006.[45] Initially, with an agreement in place with Toronto Hydro to partner on a second turbine, and with the site at Ashbridges Bay still alive (though on hold), there was an expectation that another wind turbine in Toronto would soon follow. Yet as opposition continued from the site's property owner, the Toronto Port Authority, two economic issues led the cooperative to reconsider the urban focus of its development strategy: economies of scale and the price of electricity. According to all sources, the wind turbine at ExPlace has never performed up to expectations. The manufacturer went bankrupt soon after the turbine was purchased, and both maintenance and power production have been ongoing issues. Rebecca Black, who was formerly WindShare's

Marketing Manager and currently works for OSEA, explains that there have been no real returns yet to members on their investment, except for one nominal dividend payment in 2005. “People did not invest because they wanted to see money back. They invested because they wanted to see a *turbine* built. Investors on a second project would want a promise of a small return…The big story about WindShare is that it is a coop…The coop model let a not too financially viable project go into the ground.” TREC’s Doncaster agrees, saying the cooperative learned that building just one turbine was uneconomical, and that the desire for a larger project led to a shift of focus away from the city: “There is not the landmass [in Toronto] to support 10 or 20 MW windfarms.” The other issue that completely changed the equation for the fledgling cooperative was a retail price cap on electricity rates that was established by the Ontario government in 2002, just months after the ExPlace turbine began generating power. Doncaster explains that the province’s price cap effectively “killed the open retail market…TREC was left saying to itself: ‘What the hell are we going to do now?’”

Though in some ways the lonely urban turbine seemed a dead end, the physical prominence of the ExPlace site was extremely beneficial as a political symbol. TREC ended up taking on the energy policy issues by helping establish a new organization—OSEA—that focused on working province-wide to promote renewable energy regulations that would be favorable to small, community-based projects. By 2006, OSEA had achieved its first major success, working with the Ontario government to establish a groundbreaking “Standard Offer Program” that would provide guaranteed long-term prices and contracts to renewable energy producers. Meanwhile, WindShare formed a new venture in partnership with the rural Countryside Cooperative to build a 10MW windfarm—LakeWind—near Lake Huron. TREC’s Iler says that “we wanted to find a way to demonstrate the economic viability of community power. As part of a larger project, with better winds, we expected a seven or eight per cent or greater return. We hoped this would attract more investors, as well as bring in the initial WindShare investors.” Unfortunately for WindShare, at the same time that the province released its new Standard Offer Program,” it announced new restrictions on connections to the electrical transmission grid. This “orange zone” included the area around the proposed new windfarm, effectively putting the project on indefinite hold.

Rediscovering the City: 2006 – present

> *If nine people dogged us through one turbine, there will be more who don't like the look of a windfarm offshore…How difficult and effective [they will be] is another question.* – Joyce McLean, Toronto Hydro

WindShare, rebuffed in its efforts to develop the LakeWind project, has reassessed its strategy. Whether the cooperative sees changes in the Toronto political landscape or has gained a new appreciation for the difficulties of developing projects away from its membership base, WindShare has returned its focus to its home turf. As Board Member Iler jokes, "So now, it's back to Toronto." Iler continues: "In Toronto, there is a fairly high level of political support for environmental initiatives… We have *great* city councilors and a Mayor who is very supportive. There is a great depth of support." It appears that the enthusiasm for wind power in the city extends outside of City Hall, as well. A city-wide survey commissioned by Toronto Hydro in late 2005 found that 77% of respondents felt the ExPlace turbine was a positive addition to Toronto's skyline, while 88% supported more turbines in the Greater Toronto Area.[46]

The most important constituency influencing the change of focus is likely the cooperative's members. Board Member Rose Kudlac explains that WindShare's original mandate was to develop two turbines in the city, and the cooperative continued accepting capital contributions beyond the $800,000 needed for the first turbine. Although the approved Ashbridges Bay location fizzled out, the excess member funds in escrow mean that "a bunch of people are expecting a larger project." Members at the cooperative's Spring 2008 annual meeting approved the preliminary idea of building two additional wind turbines at Exhibition Place,[47] an idea that Kudlac feels will take advantage of the economies of scale to be gained by developing and operating multiple turbines at the same site. Like seven years earlier, the management of ExPlace seems receptive to the idea. As CEO Dianne Young sees it, "We have 192 acres at Exhibition Place, so having 2 more wind turbines could be accommodated, and we are now proceeding to look at locations. The Chair of the Board of Directors [Joe Pantalone], who is the Deputy Mayor of the City of Toronto, is also a huge advocate of green innovative technologies so he is very supportive of these types of projects." Young also cites ExPlace's widely-publicized goal to achieve energy self-sufficiency

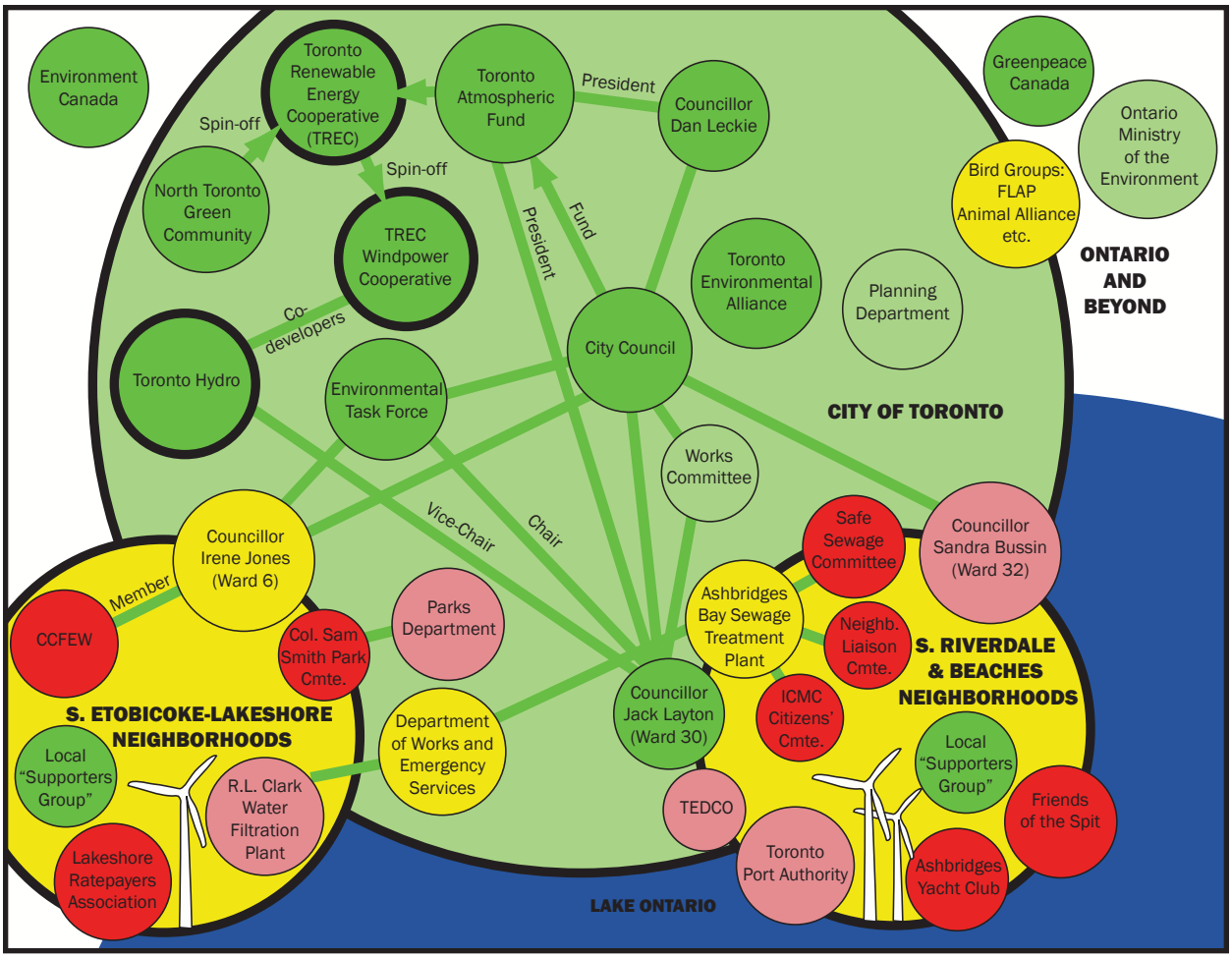
by 2010 as a motivating factor. In addition to wind power, initiatives include the largest solar PV installation in Canada and a $4.4 million gas trigeneration system.[48]

In late 2005, Toronto Hydro began exploring a new project of its own in the city, an offshore windfarm of 30 turbines to be located in the shallow waters of Lake Ontario. The city-owned utility received provincial approval to study wind speeds 2km off the shoreline of Scarborough, a former municipality that now forms the eastern edge of the City of Toronto. Preliminary plans were for 60MW of electricity, enough to power 20,000 homes.[49] As Toronto Hydro's McLean explained, "We had talked to a small number of environmental groups, city councillors, the Mayor. [We got] two pieces of feedback: If this could help shape the…city as a leader in renewable energy, then it's all good. [On the other hand,] people… near proposed sites would be worried about potential loss in property value." The proposal was quickly shelved, however, as Ontario's Ministry of Natural Resources, reacting to a protest against a wind farm proposal elsewhere in rural Ontario, announced a moratorium on all offshore wind power development in the Great Lakes in November 2006. By the beginning of 2008, as it became clear that Ontario's government was considering ending the moratorium,[50] Toronto Hydro had revived the proposal. Though the utility has not yet performed a full wind analysis or made the technical case for the project, McLean now describes the project as "a large, up to 200MW wind farm" —enough to power about 70,000 homes.

The Lake Ontario wind farm proposal received an early boost in 2006 from a coalition of politicians, neighborhood groups, and environmentalists in the Riverdale and Beaches neighborhoods. Reacting strongly against a proposal—supported by the Ontario Power Authority (OPA) —to construct a new 550MW gas-fired power plant along the waterfront, the neighborhood advocates instead won city support for a "Port Lands Green Energy Plan." The alternate plan would have included a package of energy efficiency projects, as well as the windfarm and a downscaled gas cogeneration plant to be built by Toronto Hydro. The proponents of the alternate plan included local Councillors Paula Fletcher and Sandra Bussin (the former opponent of the Ashbridges wind turbine sites), as well as New Democratic Party Leader Jack Layton (the former champion of the turbine),[51] all of whom objected to locating a new industrial facility on a revitalization-targeted waterfront. The Green Energy Plan was ultimately defeated later that year. The OPA, fearing Toronto would be "walking into the valley of death" and face rolling blackouts by the summer of 2008,[52]

decided in favor of the initial gas plant proposal. Mayor David Miller lamented the higher-level decision: "The whole effort of the provincial government and the federal government is to revitalize Toronto's waterfront. It's a huge opportunity for job creation, job growth, green industries. And to build a large power plant next door to another one doesn't make any sense."[53] Councillor Fletcher summed up her opposition to the power plant in a similar manner, saying "We're not NIMBYs, we're waterfront guardians, and we like to have solutions from our future, not from our past…And that 550-megawatt plant is a solution from our past."[54]

While the prospect of the windfarm lives on, it remains to be seen how Toronto Hydro will engage the support of the neighboring community in Scarborough. As Joyce McLean sees it, there are three important aspects to consider in any wind power project: the economic case, the technical case, and community acceptance. “Without one, the whole project fails. If you have wind without community support, it doesn’t make a lot of sense to do this.” Further, McLean points out that Toronto Hydro “has no experience with larger wind developments, and certainly not offshore development.” The company has talked with private developers, including European companies with expertise in offshore wind power, as it searches for answers to preliminary technical questions. Yet if the project proceeds, it will be interesting to observe whether a partnership with a private developer would impact community opinions toward the project. WindShare’s Iler, an attorney with experience helping cooperatives, warns that a private developer would not necessarily be welcomed on Toronto’s waterfront. “The reception would be drastically different. They would be seen as outsiders. Even people like sailors would be less keen on accepting the intrusion into their sailing grounds…People would be more likely to talk about them as eyesores.”



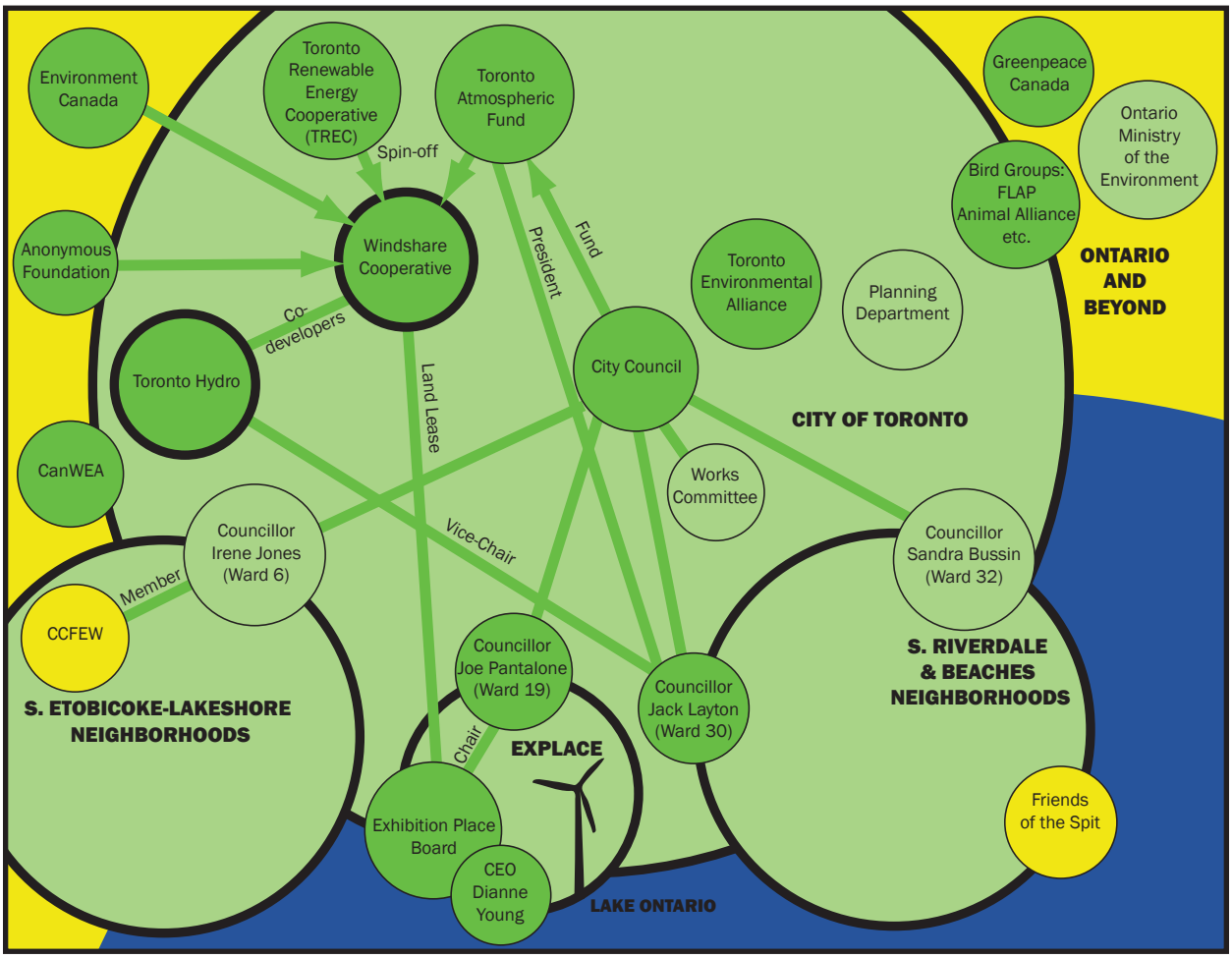
Toronto, Ontario

Site Selection Phase

1998 - Spring 2001

The Toronto Renewable Energy Cooperative (**TREC**) grew out of the North Toronto Green Community in 1998. By 1999, TREC formed a separate windpower development cooperative and entered into a joint venture agreement with **Toronto Hydro.** The partners focused on clusters of potential lakefront sites in two different neighborhoods. With the strong backing of Councillor Jack Layton, the proposal to develop wind turbines on the Toronto waterfront won preliminary approval from the **City Council** but vocal opposition grew in both neighborhoods. TREC worked on improving its outreach strategy by forming local "supporters groups" and recruiting members throughout the city.

- Strongly supportive of local wind energy project
- Mildly supportive of local wind energy project
- Mixed feelings about local wind energy project
- Mildly negative feelings toward local wind energy project
- Strongly negative feelings toward local wind energy project
- No discernible feelings toward local wind energy project
- Member or Contractual relationship
- Dispute
- Existing wind turbine
- Proposed wind turbine



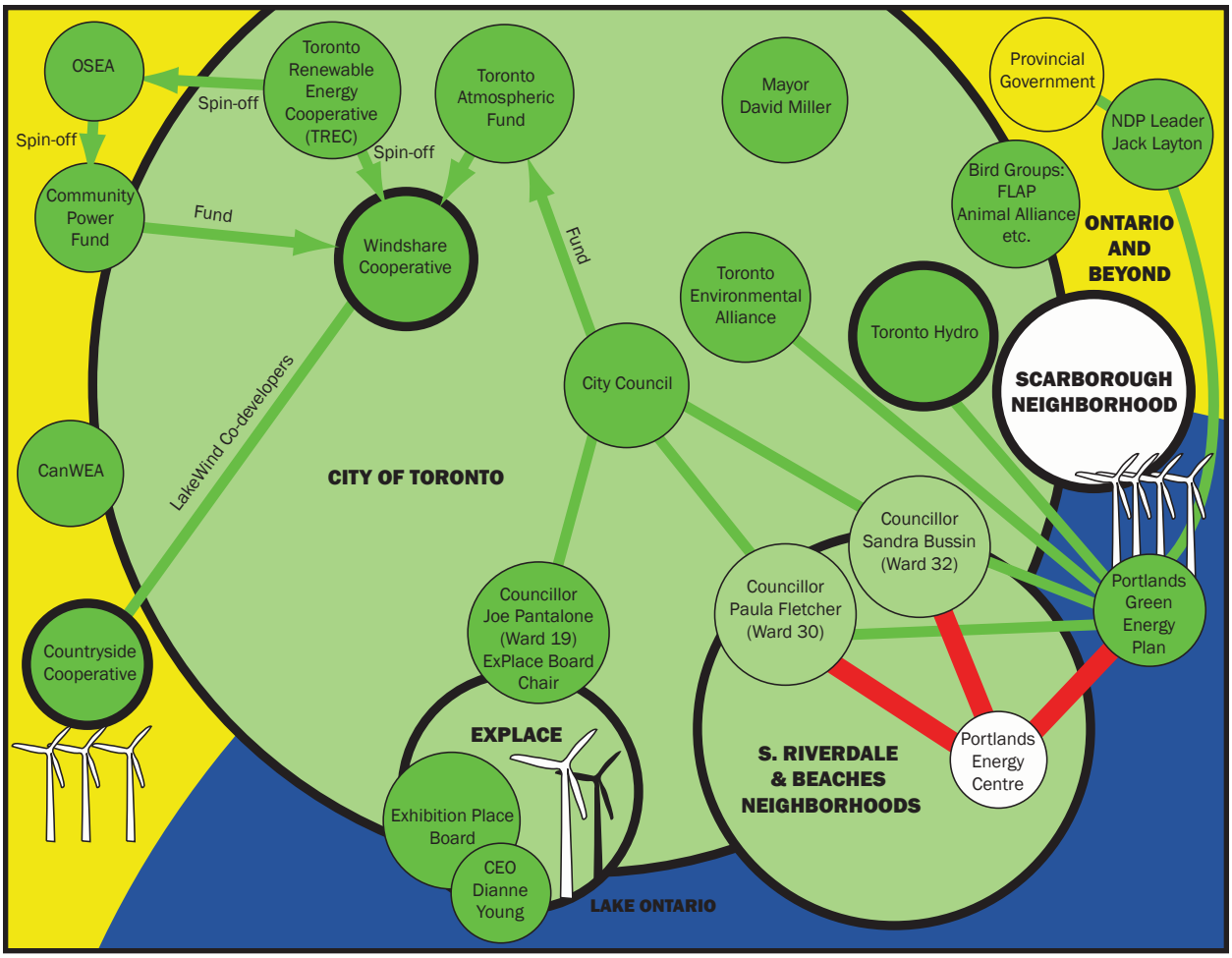
Toronto, Ontario

Development and Publicity Phase
Spring 2001 - 2004

The sites on the Etobicoke waterfront were dropped due to neighborhood opposition, while the **City Council** approved one of three sites in the South Riverdale neighborhood. However, ongoing opposition from neighborhood groups encouraged TREC and Toronto Hydro to look elsewhere.

The **Board of Governors** of ExPlace was extremely receptive to the idea of the wind turbine, and by December of 2002, the turbine was erected on a site that is in prominent view of passing commuters and the millions of annual visitors to the Canadian National Exhibition. Only the third wind turbine in Ontario, the ExPlace turbine created great symbolic value for advocates of changes to provincial energy policy.

- Strongly supportive of local wind energy project
- Mildly supportive of local wind energy project
- Mixed feelings about local wind energy project
- Mildly negative feelings toward local wind energy project
- Strongly negative feelings toward local wind energy project
- No discernible feelings toward local wind energy project
- Member or Contractual relationship
- Dispute
- Existing wind turbine
- Proposed wind turbine



Toronto, Ontario

Further Exploration Phase

2005 - present

WindShare began to focus on wind power development outside of Toronto, partnering with the rural Countryside Cooperative to explore the **LakeWind** project on Lake Huron. Restrictions on grid interconnection leave that project on hold.

WindShare is considering two additional turbines at **ExPlace**, while **Toronto Hydro** explores the idea of an offshore wind farm near **Scarborough Bluffs**. The idea briefly gained support from a **coalition** of community groups fighting a proposed gas-fired power plant in the Port Lands. A provincial **moratorium** on offshore wind power was enacted in late 2006 but lifted in January 2008, breathing new life into the plan.

- Strongly supportive of local wind energy project
- Mildly supportive of local wind energy project
- Mixed feelings about local wind energy project
- Mildly negative feelings toward local wind energy project
- Strongly negative feelings toward local wind energy project
- No discernible feelings toward local wind energy project
- Member or Contractual relationship
- Dispute
- Existing wind turbine
- Proposed wind turbine

Interviews

Rebecca Black, WWEA Conference Coordinator (OSEA) and former Marketing Manager, WindShare
January 8, 2008 at OSEA offices, Toronto

John Carley, Co-Chair, Friends of the Spit
Phone interview, January 18, 2008

Deborah Doncaster, Executive Director, Community Power Fund
Founding Director, OSEA, and Former Project Director, TREC
January 7, 2008 at CPF offices, Toronto

Brian Iler, Board Member, TREC and WindShare
January 8, 2008 at Indochine Restaurant, Toronto

Rose Kudlac, Board Member, WindShare
January 8, 2008 at Timothy's Coffee House, Toronto

Joyce McLean, Director of Strategic Issues, Toronto Hydro Corporation
Chair, Board of Directors, Canadian Wind Energy Association
Chair, Board of Directors, Community Power Fund
Phone interview, January 15, 2008

Dianne Young, CEO, Exhibition Place
Email correspondence, March 4, 2008

Figure Sources

A. Photograph used with permission of Stewart C. Russell.

B. Sketch of Proposed Wind Turbine Locations, October 4, 1999. *Wind Turbine Environmental Assessment*. Draft Screening Document. February 2000. Figure 1.

C. Works and Environmental Services, City of Toronto. Landscape Site Design Project: Ashbridges Bay Treatment Plant. October, 2003.

D. Sketch of Proposed Wind Turbine Locations, October 1, 1999. *Wind Turbine Environmental Assessment*. Draft Screening Document. February 2000. Figure 2.

E. Friends of the Spit newsletter, April 1998. <friendsofthespit.org>

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[5] Interview with Joyce McLean.

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[9] *Bringing Climate Change Solutions to the New City*. Toronto Atmospheric Fund 1998 Annual Report.

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[11] Interview with John Carley.

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[13] McAndrew, Brian. "Hydro Backs Waterfront Windmill Plan." *Toronto Star*. July 1, 1999.

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[17] Harrison, Michael. Letter from CCFEW to TREC, June 1, 1999. Appearing on Etobicoke Community Council Agenda, June 23, 1999. <www.toronto.ca/legdocs/1999/agendas/committees/et/et990622/agenda.htm>

[18] Jones, Irene. Letter to Bryan Young, TREC, May 25, 1999. From *Wind Turbine Environmental Assessment*. Vol 2. April 2000.

[19] Cash, Andrew. "Residents Tear Blades off Windmill Plan." *NOW Magazine*. July 15, 1999.

[20] TREC's Deborah Doncaster explains that after the wind turbine proposals were met with opposition at several public forums like this one, "We learned that we had to open up our membership" in order to build a constituency and have a presence at community meetings.

[21] Works and Environmental Services, City of Toronto. Landscape Site Design Project: Ashbridges Bay Treatment Plant. October, 2003.

[22] Southworth, Natalie. "Windmill Plan Breezes through Committee." *Globe and Mail*. July 13, 2000. Page A18.

[23] Friends of the Spit website <www.friendsofthespit.ca> referenced on March 26, 2008.

[24] The Friends' membership were not unanimous in their opposition to wind turbines adjacent to the Spit. According to Carley, a handful of FOS members actually resigned over the group's opposition to the wind turbines.

[25] TREC's 1999 siting report listed the Leslie Street Spit as the best location in Toronto for wind power, if wind was the only consideration. The cost of grid interconnection was listed as a concern.

[26] TREC's Doncaster adds that "obstructionist" tactics by TEDCO, the property owner, contributed to TREC abandoning the site at the base of the Spit.

[27] Southworth 2000.

[28] *Wind Turbine Project: Terms of Reference for Environmental Assessment Study; ICMC Review; and Siting of Utility Wind Turbine at the Ashbridges Bay Treatment Plant*. Toronto City Council. August 1, 2000. Downloaded March 18, 2008 from <www.toronto.ca>

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[32] City Council records show that the owners of the turbine entered into a 15-year renewable lease with ExPlace – a City of Toronto entity - with annual payments of $2,000 in cash or electricity equivalent.

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[45] Black 2006, Page 63.

[46] Environics poll, October 2005. Cited by Joyce McLean, Toronto Hydro, at Great Lakes Offshore Wind Technical Gathering. April 4, 2006. Downloaded March 18, 2008 from <www.eere.energy.gov/windandhydro/windpoweringamerica/wkshp_2006_offshore.asp>

[47] Email communication from Stewart Russell, WindShare Board member. May 4, 2008.

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[49] Spears, John. "Testing the Winds of Change." *Toronto Star*. January 10, 2006. Page A3.

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[53] Lu, Vanessa. "Power plant okayed despite protests." *Toronto Star*. September 19, 2006.

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PALMDALE: “A Place to Call Home”

Figure A: The view from the Antelope Valley Freeway. Looking north across the lake to the City of Palmdale, with the California Aqueduct in the foreground.

The Antelope Valley Freeway provides the twice-daily routine for an ever-growing population of commuters crossing the mountains between the Los Angeles Basin to the south and their high desert homes. The AV Freeway—the 14—follows the Soledad Pass on its winding course out of the Antelope Valley, up into the line of hills that provides a break between the San Gabriel Mountains stretching away to the southeast and the Sierra Pelonas to the northwest. Palmdale, astride the freeway where the valley floor meets the mountains, has received a good share of the Valley’s last 25 years of population growth. A few years

after the completion of the freeway, Palmdale in 1980 was still an agricultural outpost of 12,000 residents. A massive period of relocation in the following decade, fueled by low home prices and the growth of the local aerospace industry, drew residents from "down below"—the southern half of Los Angeles County. In 1990, the City's population stood at 69,000. Today, Palmdale is home to more than 145,000 people.[1]

As the AV Freeway dips into the Valley, skirting Lake Palmdale before turning due north toward Lancaster and Mojave, a pull-off gives access to a scenic viewpoint. To the north, beyond the sprawling City of Palmdale, stretches the Antelope Valley, hemmed in on the far side by the Tehachapi Mountains. To the east is the vast Mojave Desert, opening wider as it spills across the horizon towards Nevada and Arizona. In the foreground is the California Aqueduct, from which Palmdale draws the majority of the city's fresh water to store in the Lake Palmdale reservoir.[2] And in the center of the view, a mile away on the far shore of the lake, stands a lone wind turbine, catching the steady southwest wind that funnels down between the mountain ranges on its way out to the desert.

Conceived by Palmdale's municipal Water District after the California energy crisis of 2001, the 950 kW wind turbine provides clean power equal to 95 per cent of the annual electricity consumption at the site's fresh water treatment plant. Though this energy production has exceeded initial expectations and provides a financial benefit to the District,[3] the project was not initially embraced by the City. A period of local controversy, now buried but not yet forgotten, delayed the turbine's construction for months before it was finally erected in the spring of 2004. The story of the wind turbine in Palmdale is one of conflicting views between the elected representatives of the City and the elected representatives of the Water District. The Water Board, motivated by a need to reduce costs and ensure reliable energy supply to its customers, saw wind power as a promising renewable energy source. The City Council, concerned about the visual effect on Palmdale's skyline as well as the Water District's ability to act independently without city approval, viewed the proposed wind turbine as an intruder—a threat to the city's image and the symbolic first step towards unwelcome large-scale wind power development. While some local residents, including a number of homeowners in the hills overlooking the lake, were vocally opposed to the project's potential scenic impacts, the dispute largely played out between the two public entities.

Municipal Power: Ensuring Reliability and Controlling Costs: 2001 - 2002

> *I think the water district will do everything that it has to do, whatever it has to do, to keep the water flowing in Palmdale*.[4] – Leslie Carter, Palmdale Water District Board President, February 2002

In early 2001, the Palmdale Water District (PWD) began exploring options for reducing its energy purchases from Southern California Edison. Stung by rising power costs and fearful of supply disruptions due to California's electricity crisis over the previous few months, PWD began a $350,000 effort to increase the efficiency of its equipment and operations.[5] The District outfitted a number of its wells and booster stations with efficient natural gas engines[6] and restarted a small hydroelectric generator at the Lake Palmdale reservoir.[7] In addition, PWD contracted with global engineering firm Black & Veatch to study the District's alternatives for electricity generation. Although the District was allowed by law to generate and distribute electricity to itself (and its customers), it was not until the electricity crisis that this possibility gained importance.[8]

By February of 2002, Black & Veatch had prepared a study for PWD outlining a number of energy options. In addition to a list of electricity generation alternatives, the report considered the costs and benefits to PWD of forming a public electric utility by purchasing Southern California Edison's facilities within the District's boundaries.[9] Several weeks later, PWD's Directors voted to ask Black & Veatch to look in more detail at the public utility option, as well as perform a more detailed feasibility study for wind and solar power projects.[10] In the view of Dennis LaMoreaux, who was the General Manager of PWD and a driving force behind the energy projects, wind and solar power were attractive to PWD for their economic benefits, but also for the satisfaction of using local, renewable resources. "This is a very windy area," LaMoreaux told me. "Over 300 days of sun a year. Those are local resources that if we could find a way to help use them to save our customers money, we like the idea."[11]

The energy options met with varying degrees of welcome. PWD eventually dropped its exploration of forming a public electric utility after what LaMoreaux describes as "a whole bunch of opposition" from Edison and different segments of the community. The solar power idea was carried forward, and PWD later that year decided to install a 30-kW solar array on the roof of its maintenance shop.[12] Preliminary discussions involved the

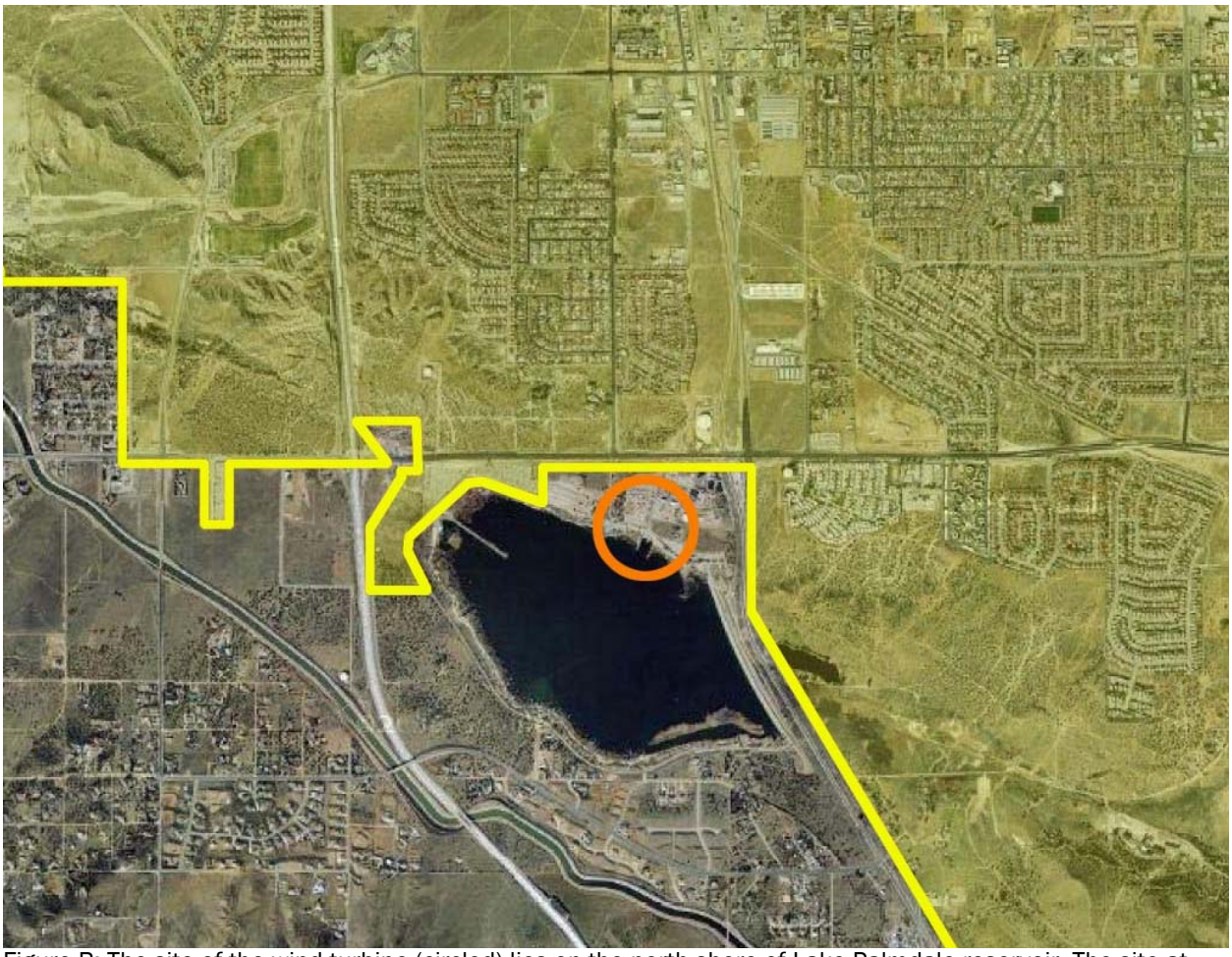


Figure B: The site of the wind turbine (circled) lies on the north shore of Lake Palmdale reservoir. The site at the fresh water treatment plant is in unincorporated Los Angeles County, just south of the City of Palmdale boundary (yellow). The San Andreas Fault can be seen running from the top left of the image to the bottom right, directly past the wind turbine. The Antelope Valley Freeway runs south from the top of the image, bends east at the California Aqueduct, and climbs through the Soledad Pass towards Los Angeles.

construction of a small wind farm on 60 windy acres that PWD owned on the Sierra Pelona ridge southwest of town. However, the District saw a number of complications in this project—including the need for power lines, the large expense, and anticipated opposition from the City—and instead turned their focus to a single turbine at the Water District's property on Lake Palmdale. According to LaMoreaux, the potential to benefit from the State of California's net metering program was key in deciding on the single wind turbine. In that same year, California enacted its Renewable Portfolio Standard, setting the goal of 20% renewable energy by 2017.[13] For every KWh produced by an on-site wind turbine, PWD's electric bill would be reduced by the corresponding retail rate. In addition, the state's Self Generation Incentive Program provided a further financial impetus to the project, with

Southern California Edison ending up paying almost $1 million—half the project's development cost—to PWD.[14]

The Water District's treatment plant on the north shore of Lake Palmdale seemed like an ideal site for a wind turbine. From a technical standpoint, the winds were good and as the District's largest electricity load center, the location would provide the highest financial returns from the net metering program.[15] Located at the rear of the PWD plant on the southern fringe of Palmdale, the turbine site seemed to be out of nearly everyone's way. The site abutted a pair of RV and boat storage yards to the west, with two park and ride commuter parking lots beyond that. Directly to the east of the site, the Palmdale Fin and Feather Club maintained a trap shooting range on the lakeshore for its members and guests. The closest residential developments were over a quarter mile away, separated from the site by Avenue S and the Sierra Highway, a pair of four-lane arterial roads giving access to the Antelope Valley Freeway.

As PWD settled upon the idea of a wind turbine, it did outreach in the community through notices in the newspaper and the newsletter in its customers' water bills.[16] A series of articles in the local newspapers also covered the project. According to PWD's LaMoreaux, who served as General Manager for 13 years until April 2008, PWD received inquiries from a number of customers that were enthusiastic about the wind turbine idea and even wanted to know how they could "tie into it," not fully understanding that the project would provide on-site power only. Yet across Lake Palmdale to the southwest, where new home developments continue to leapfrog patches of desert in their steady creep up into the hills of unincorporated Los Angeles County, a number of homeowners were not happy about the idea of the wind turbine altering the expansive view of Lake Palmdale and the Antelope Valley. The District held at least two meetings specifically to meet with residents, share visualizations and details of the project, and to address their concerns. The meetings themselves, recalls LaMoreaux, "were pretty well attended, probably one to two dozen of the people that were really concerned." Laurie Lile, who was Palmdale's Director of Planning at the time, remembers "a lot of animosity. And the Water District has a fairly small boardroom and on at least two occasions when they discussed it, the room was filled, and they were standing, and I don't recall anyone standing up to speak on it saying it was a good thing."

The aesthetic landscape impact of a 240 foot tall wind turbine (330 feet counting the sweeping blades) was the primary issue raised by community residents who were opposed

to the project.[17] Opponents called the turbine a "good project" in the "wrong location."[18] However, some residents also expressed concerns that were even more difficult to weigh against the turbine's renewable energy benefits. Among other comments reported by the media, some arguments dealt with the image that Palmdale and the Antelope Valley projected to outsiders. One resident wrote the Water District: "Putting it dead center in the view from the Highway 14 overlook will bring great joy to our neighbors to the south who love to make fun of the 'ignorant hicks' that are stupid enough to live in the Antelope Valley…If the first thing you see is this giant thing that basically says, 'The wind blows out here'…you're advertising a negative for the whole valley."[19]

Despite the objections of these homeowners, the Water Board's Directors pressed ahead with the project, expressing their support in a series of votes throughout 2002. One Director—Ronald Cunningham of District 2—voted against the other four members of the Board on at least two occasions that year, voicing concerns about the appearance of the turbine[20] as well as the financial[21] and environmental[22] aspects of the project. In LaMoreaux's view, Cunningham—whose district included the residents in the hills that objected to the project—was responding to the views of these homeowners: "They were in his district…so he didn't support it." The rest of the Board continued their support and, after hiring a consultant to complete an Initial Study of environmental issues, PWD released a mitigated Negative Declaration[23] for public comment in October 2002.

A "Windmill Behemoth"[24]: November 2002 – Spring 2004

> *We didn't really expect that there would be that much opposition to a single windmill…We spent quite a bit of time explaining that it wasn't going to be a wind farm. It wasn't going to look like Palm Springs or Tehachapi.* – Dennis LaMoreaux, former General Manager, Palmdale Water District

The reaction from the City was swift. According to LaMoreaux, PWD had approached Palmdale's leadership at an early stage, and received objections from the very beginning. "Myself and a couple Board members met with the City Manager and tried to explain what we were trying to do. And that didn't help," LaMoreaux told me. After PWD released its mitigated Negative Declaration for public comment, Palmdale Director of Planning Laurie Lile sent a letter to the District raising a number of issues that the City felt were

inadequately addressed in the Initial Study. The letter requested that PWD perform a full Environmental Impact Report and mentioned the danger of the project's location on the San Andreas Fault. The letter's primary concern was the "significant aesthetic impact to the City" of a wind turbine:

> This is significantly larger than any current structure located within the vicinity and will have a *negative impact on the visual character of the City* of Palmdale…A 250-foot high turbine will be readily visible from [three designated scenic routes] as well as a wider area of the City. The City does not believe that any proposed mitigation measure will adequately mitigate the highly negative impact the proposed project will have on *aesthetics*…Unless these issues are resolved through cooperative planning efforts between our agencies, the City will actively oppose this project.[25]

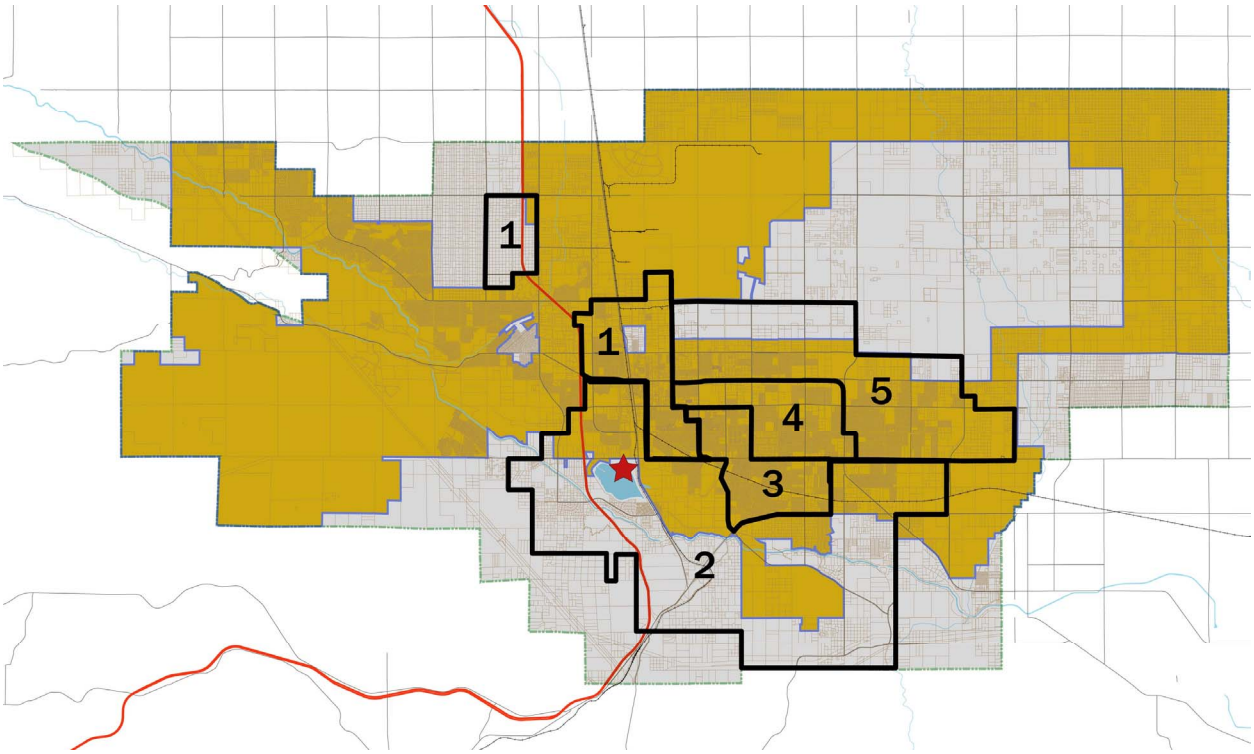


Figure C: Overlapping jurisdictions of the City of Palmdale (yellow), Palmdale's sphere of influence (grey), and the Palmdale Water District division boundaries (black outlines, numbered). PWD also serves additional unincorporated areas to the southeast.

Though the site of the wind turbine was just outside the City's boundary in unincorporated Los Angeles County, it was well within the "sphere of influence" covered by Palmdale's General Plan.[26] In that plan, the views of the Antelope Valley from the Freeway were to be protected as "scenic view corridors,"[27] and it is the turbine's disruption of these views that became a focus of the City's objections. Yet as Palmdale's Lile explains, California law allowed the Water District to build the wind turbine with no oversight by the City (or any

other agency). According to PWD's LaMoreaux, "We are exempt from local ordinances, which meant city and county ordinances…so neither could really do any more than voice their opinion." Over the City's objections, the PWD Board voted several weeks later to approve the mitigated Negative Declaration—with Director Cunningham again dissenting.[28]

A month later, in mid-December, the City of Palmdale filed suit against PWD in Los Angeles Superior Court, seeking a full environmental review and an injunction to halt the project. The legal filing emphasized the turbine's scenic impacts, which the City claimed PWD entirely discounted:

> The Project will, however, directly, immediately and substantially impact and impede residential views of the San Gabriel Mountains south and west of the Project site. Likewise, the Project will directly, immediately and substantially impact views of the City and the Antelope Valley from Highway 14 (along the very first viewing stretch on Highway 14 encountered by motorists traveling north from Los Angeles, the San Fernando and Santa Clarita valleys)…A 320-foot windmill tower next to a Scenic Highway cannot be dismissed as having no significant impact, as the District purports to do. The significant, substantial adverse impacts on view aesthetics that the Project will cause are not mitigated to insignificance by the paltry mitigation measures adopted in the Mitigation Plan (painting with non-reflective paint).[29]

In addition, the suit raised potential biological impacts to Lake Palmdale's resident and migratory birds. The City called PWD's study "patently absurd" and claimed that the Water District would merely count "the dead and eviscerated carcasses" of birds, rather than do anything to prevent such an outcome. The lawsuit claimed that PWD "repeatedly downplayed, discounted and hid potential adverse impacts by clever manipulation of the facts." The City's attorney later accused the Water District of "a deliberate indifference to the environmental process" of the California Environmental Quality Act.[30]

Figure D: Palmdale, with the San Gabriel Mountains to the south.

To LaMoreaux, the City's emphasis on birds did not represent its true objections, but

rather “just something for them to latch onto.” According to the PWD General Manager, “They used really excitable language, but it was just another avenue. They used anything they could think of to try to kill the project.” However, the judge in the case sided with the City in the spring of 2003, ordering the Water District to prepare a full Environmental Impact Report. Although the judge’s ruling did not deal with the aesthetic issues raised by the City, the District was required to put in place a mitigation plan to reduce the turbine’s impact on birds.[31] After another period of public comment, PWD’s Directors—feeling the overwhelming majority of public opinion was on their side—approved the full EIR in October of 2003. Director Cunningham was again the lone voice of dissent on the Board.[32] According to Lile, the City still felt that PWD had only “followed the letter of the law,” not the intent. As PWD finally began preparations to build the turbine in the spring of 2004, Palmdale’s Mayor Jim Ledford said: "I'm disappointed. I'm sure the community will be when they see this monstrosity erected."[33]

Living with a Changed Skyline: Spring 2004 - present

> *People time to time joke, ‘When are you going to take that thing down? - realizing that that is not a feasible option.* – Laurie Lile, Assistant City Manager

Although the discussion over the wind turbine’s aesthetics focused on Palmdale’s relationship with its natural and historical landscape of Joshua trees and snow-capped peaks, this view of the Antelope Valley leaves out half of the region’s story. On its website, Palmdale celebrates growth in an upper-middle class city with “a comfortable hometown feel with a strong family orientation, excellent education system and abundant recreational opportunities in a safe environment.”[34] Yet this growth is itself closely tied to the region’s parallel moniker—the “Aerospace Valley.” In 2001, the surrounding area—the “Aerospace Capital of America”—employed over 28,000 aerospace and defense workers, an economic engine whose success is key to the fortunes of Palmdale. These workers are scattered at sites including Edwards Air Force Base, the Edwards Rocket Site, Lockheed Martin, Boeing, Northrup-Grumman, and Palmdale’s own Air Force Plant 42—where NASA’s space shuttles were assembled.[35] In fact, at the scenic viewpoint on the AV Freeway, a monument was built in 2003 celebrating “The Aerospace Valley.” Overlooking the city and Lake Palmdale below, a plaque describes the “numerous milestones in flight” that occurred in the skies of “the

world's premier aerospace location," beginning with Chuck Yeager's breaking of the sound barrier in 1947.[36]

Palmdale's image is strongly defined by these two identities—Aerospace Valley and Antelope Valley. What is somewhat surprising is that the City—while simultaneously promoting the growth of the defense industries in the large military and civilian facilities on the north side of town, would feel so threatened by the image of a wind turbine to the south. The City's legal filing against the Water District called the project a "178-foot aerial buzzsaw" that would threaten 156 different bird species.[37] Among other arguments raised by local residents was the fear that the turbine would bring "gigantic mechanized industrialization" to the Antelope Valley.[38] Yet Air Force Plant 42, developed in the early 1950s to facilitate "flight testing high performance jet aircraft over heavily populated areas,"[39] continues to be used in the development and manufacturing of sophisticated aircraft ranging from the B-2 stealth bomber to unmanned aerial drones for use over Iraq, Afghanistan, and elsewhere.[40] The environmental and wildlife effects of these facilities are surely significant.

Raul Figueroa, a mechanical engineer at Lockheed Martin, has served on the Board of Directors of the Palmdale Water District since 2004. He was elected to the Board just a few months before the wind turbine was finally erected. Though the decisions about the project were made before Figueroa joined the board, he praises the wind turbine as a "good idea" that has generated electricity to offset costs and benefit ratepayers. Describing the view from the Freeway overlook, Figueroa describes the turbine as "sort of a landmark, to tell you the truth…And it stands out, the wind turbine right there…People see it…For a while, it was like, [laughs] 'We know which way to go. We see it.'" Yet for Figueroa, the wind turbine's impacts are less than many other structures, such as billboards or the operations of the valley's aerospace industry. "If you have an open area, you can see it. Or if you're up at a high area, you can see it. But, you know, Lockheed Martin has these huge hangars and you can see that…So you have these huge things that do stick out in different areas…"

The tensions over the project have cooled over time. Figueroa, like the other interviewees from the Water District that I spoke with, described the city's opposition to the project, but feels there have been few problems since the turbine was installed. To Figueroa, the fears of the city's political leadership over the project's visual impact have calmed over the past four years as no further wind turbines have been built: "That's kind of like history. I don't think it really matters anymore. The city never brought anything up about it again."

Despite the City's initial objections, the project's economic success has proven wind technology's viability, according to PWD Engineering Director Matt Knudson. "I don't mean to downplay it," Knudson remarked, "there [were] some legal challenges from the City of Palmdale, and some opposition from the general public, but we were able to work through it." PWD's LaMoreaux claims that complaints from residents ceased shortly after the project was built, and a number of compliments even started to roll in. A story in the Antelope Valley Press a year after the turbine was built corroborates these reports. Entitled "Not Aesthetic but Economical," the piece reports that the City's Planning Department had stopped receiving the agitated phone calls that it fielded shortly after the turbine's construction.[41]

Still, for Planning Director Lile (now Assistant City Manager), the wind turbine has not yet blended into its surroundings. She describes the turbine as a "towering" sight that alters the view of the entire Antelope Valley. "It is right there, when you come into town…next to what had been a very scenic viewshed… and now it's sort of sticking up like a sore thumb," Lile tells me. After four years of living with the turbine, she feels that there is still a lingering sense of annoyance on the City Council regarding the wind project, though she is quick to emphasize that the City is supportive of clean energy. "Now, solar stuff is fine. *Wind* stuff is bad…It's not that there is a bias against renewable energy. There's a bias against wind turbines." In 2007, the City entered an agreement with a private energy company to build a 500 MW gas power plant and a 50 MW solar power plant north of town. The City used $18 million of public funds to purchase the land for the project because, as Palmdale's newsletter reported, "safe, affordable, reliable power is vital to keeping businesses in Palmdale and attracting new jobs."[42]

The wind turbine's power production has exceeded initial expectations, producing nearly all of the water treatment plant's annual electricity needs. This fact has been consistently emphasized in PWD's promotional materials.[43] PWD's Knudson thinks that the Water District's staff would be supportive of future wind projects if the opportunity arose, based on the technical success of the first project. Water Board Director Figueroa says that wind power should definitely be considered for a new treatment plant the District is considering several miles outside of town. However, despite the project's technical success and economic benefits for the Water District, LaMoreaux feels that the current makeup of the Water Board would be unlikely to support a new wind power project. He points to the "political fallout" from the wind turbine dispute as evidence. According to LaMoreaux, as a

direct result of the wind turbine controversy, “the mayor vowed to get rid of all the Directors…and it’s happened.” After the death of former Board President Leslie Carter, subsequent elections have led to a Board currently dominated by “candidates the mayor backed.”[44] LaMoreaux continues, “And then I don’t know what you heard about me…I’m not sure how much that has to do with what they decided to do with me.” In December of 2007, the PWD General Manager was placed on paid administrative leave in a contested 3-2 vote of the Water Board[45] that was without public explanation.[46] Despite a public outcry, LaMoreaux officially resigned his position three months later after negotiations with the Water District.[47]

More than Just a Wind Turbine

Although scenic views and wildlife concerns played a role in the objections by the City and some residents, so did a pair of other factors that had less to do with the specific project. The first background factor was the area’s previous experience with large scale wind power development. The second issue was the somewhat complicated relationship that had developed between the City and the Water District as they shared overlapping jurisdictions over the course of several decades.

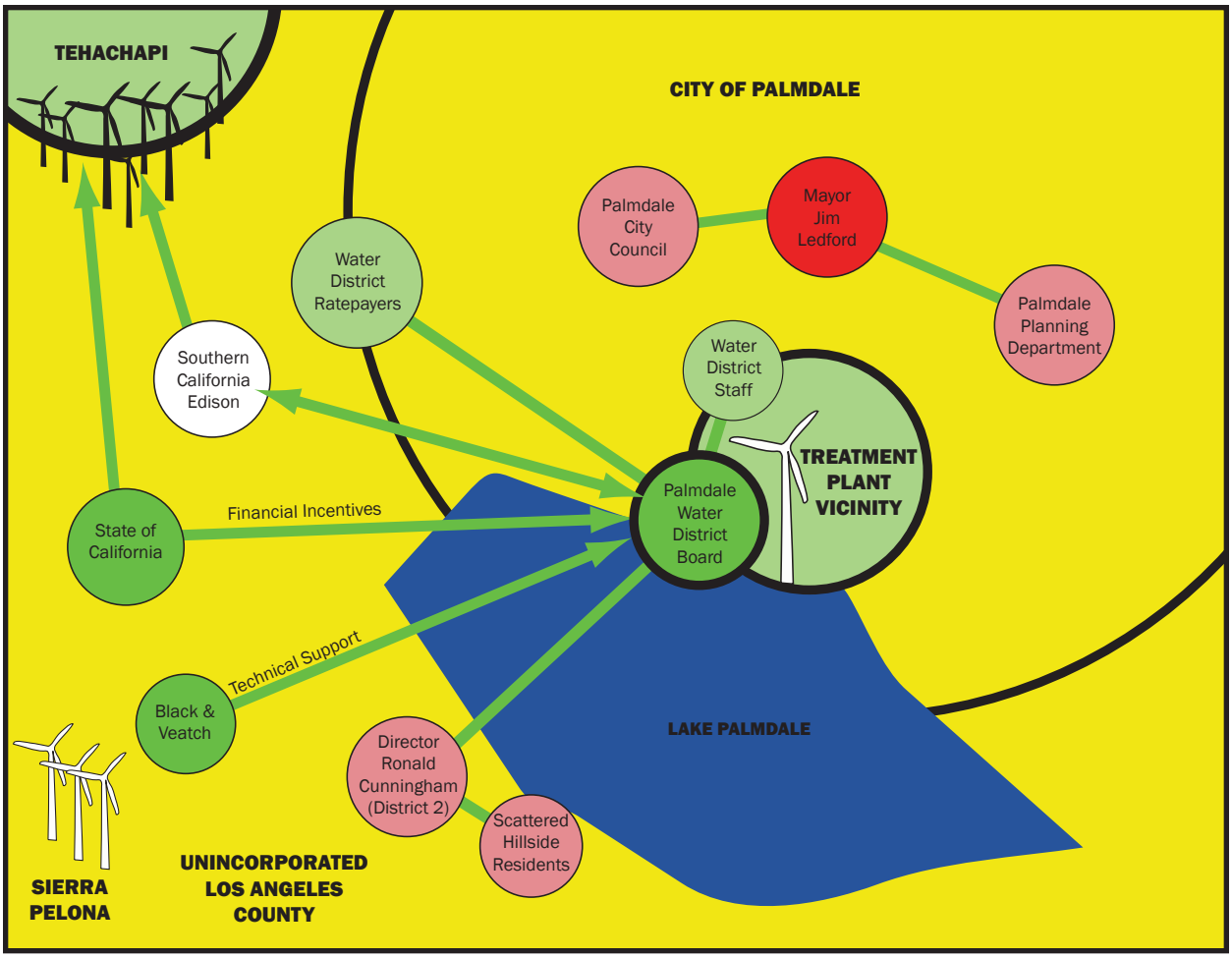
Forty miles north of Palmdale, on the opposite flank of the Antelope Valley, lies Tehachapi. In the 1980’s, the windswept Tehachapi Pass became one of three major windfarm locations in California. By 1992, with California providing half of the world’s wind power production, Tehachapi led the world with one quarter of the wind power capacity on the planet.[48] However, with thousands of turbines of various shapes and sizes covering the hills, even some of wind power’s champions questioned whether the wind industry could continue following the Tehachapi model. Wind advocate and nearby resident Paul Gipe, the author of several books about wind energy, himself argued in the mid-90’s that “California’s haphazard and aesthetically jarring development paints an ugly picture for the future” and threatened the success of the technology.[49]

To Palmdale’s Lile, the PWD’s wind turbine was not just objectionable due to its appearance and location, but because it symbolized a wider disregard for the community’s vision of its scenic surroundings. Since the first wave of wind energy development in the 1980s, Lile says, there has been “a concern within the community that our hillsides would

end up looking like Tehachapi…a community level of concern with wind development." To the community, in Lile's view, the PWD project signified "the idea of wind energy taking over the area…It's hard to describe." Before and after PWD proposed its wind turbine, Palmdale was approached by private developers interested in the wind energy potential of the City's surrounding hills. Lile describes how these "speculators," faced with a lack of interest on the part of the city, have thus far failed in any attempts to build wind turbines in the vicinity. In fact, in the spring of 2004, at the very same time that PWD was preparing to build its Lake Palmdale turbine, a private developer's proposal for a 20-turbine wind project southwest of Palmdale[50] was met with what LaMoreaux calls "huge opposition" by the community.

PWD's Knudson and LaMoreaux both argue that the City's opposition to the wind turbine was rooted primarily in a fear of sending the wrong signals to private wind energy developers, not on the merits of PWD's project alone. Knudson says the City feared that allowing the turbine would "open the door" to private developers, and that Palmdale would then be "inundated by wind turbines." Mayor Ledford's statements to the press before and after the City's lawsuit express his worry that allowing the Water District's project would "set the stage" and establish a precedent for future wind turbines.[51] After the court ordered PWD to complete its full environmental study, Ledford admitted: "I'm not concerned with the one windmill. I'm concerned about the windmill farm… I don't want us to look like Palm Springs' [San Gorgonio Pass wind farms]…I don't think that's the vista we want for our city."[52]

In addition to any objections about wind power, the City's response seems based on another, even more long-standing, dynamic: the relationship between the City of Palmdale and the Palmdale Water District. "I think you would probably say it is typical," LaMoreaux says of the City's response to the wind turbine. "The boundary that the District serves is…a little more than half of the city, and then [the District includes] areas that are unincorporated around it…and the district is very old, it's got rights that go back to the 1880s." In LaMoreaux's view, the overlapping jurisdictions of two elected government bodies results in periodic and predictable disagreements. While the Water District began as an irrigation district in the 19th Century, the City is relatively young, incorporating only in 1962. Among other issues, City road construction projects must frequently deal with costs to relocate Water District pipes and infrastructure. "So there's basically a rub there because the Water District has stood up for itself over time…I think that probably added to the tone of all those articles you probably read," LaMoreaux explains, laughing.



Palmdale, California

Planning and Development Phase
2001 - Spring 2004

Responding to the California electricity "crisis" of 2001, the **Palmdale Water District** (PWD) explored a number of options to reduce its energy purchases and ensure reliability. Generous **State of California** incentives, including a net metering program, encouraged PWD to look at wind power. After briefly considering a small windfarm in the Sierra Pelona hills, PWD settled upon a single turbine at its water treatment plant.

The **City of Palmdale**, concerned about the turbine's scenic impacts, vigorously opposed the project. The City feared opening the door to large-scale wind power development similar to nearby Tehachapi

Strongly supportive of local wind energy project

Mildly supportive of local wind energy project

Mixed feelings about local wind energy project

Mildly negative feelings toward local wind energy project

Strongly negative feelings toward local wind energy project

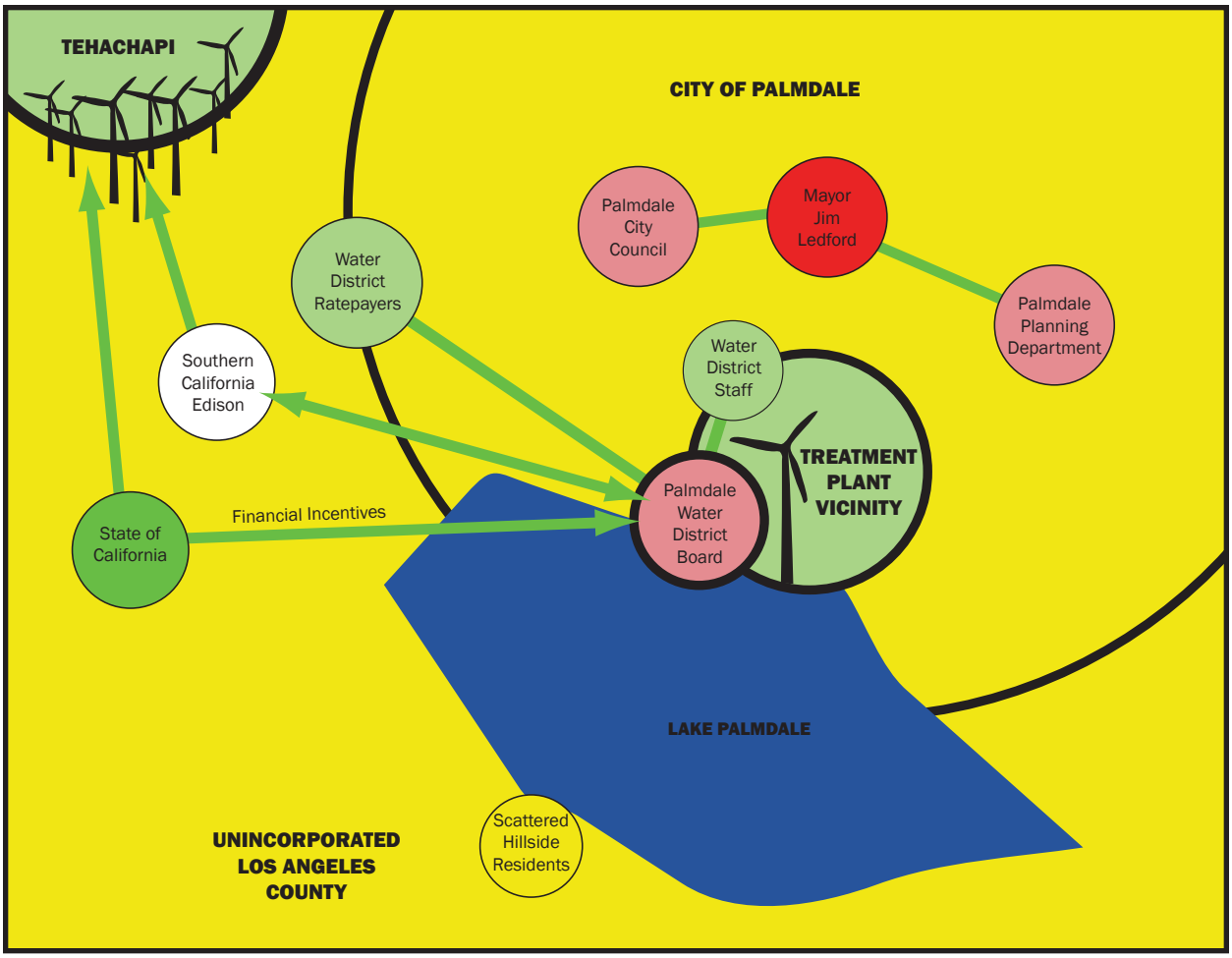
No discernible feelings toward local wind energy project

Member or Contractual relationship

Dispute

Existing wind turbine

Proposed wind turbine



Palmdale, California

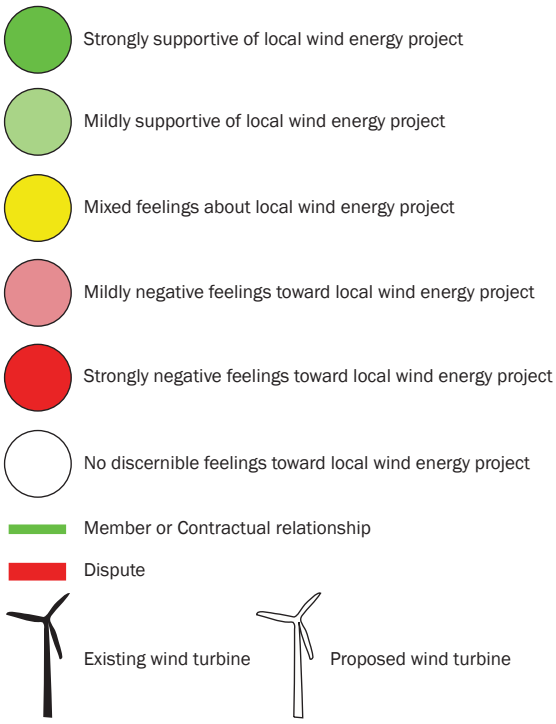
Post Construction Phase

Spring 2004 - Present

A number of **homeowners** in the hills south of Lake Palmdale were initially vocally opposed to the wind turbine, but the Water District and the Planning Department both report that complaints trailed off quickly after the turbine was built.

While the tensions raised by the project have cooled, Palmdale's city government and **City Council** remain opposed to the spread of wind power near the City.

PWD has publicized its wind energy project, but as the composition of the **PWD Board of Directors** and management has changed, there is currently little advocacy for further wind power development by the Water Board.



Interviews

Raul Figueroa, Board of Directors, Palmdale Water District
Phone conversation, April 22, 2008

Matt Knudson, Engineering Director, Palmdale Water District
Phone conversation, March 20, 2008

Dennis D. LaMoreaux, General Manager, Palmdale Water District
Phone conversation, April 28, 2008

Laurie Lile, Assistant City Manager, City of Palmdale (formerly Director of Planning)
Phone conversation, March 24, 2008

Figure Sources

A. Used with permission from Aquafornia.com

B. Diagram by author

C. Diagram by author includes boundary information from City of Palmdale and Palmdale Water District websites.

D. "Palmdale and Mountains." Public domain image. Downloaded April 26, 2008 from <en.wikipedia.org/wiki/Image:Palmdale_and_Mountains.jpg>

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[1] City of Palmdale. Community Profile. Downloaded April 27, 2008 from <cityofpalmdale.org>

[2] Palmdale Water District. <palmdalewater.org>

[3] Palmdale Water District. "Municipally-Owned Wind at Palmdale Water District." Poster: 2007.

[4] Drake, Julie. "Water District Seeking Ways to Save Costs." *Antelope Valley Press*. February 16, 2002.

[5] Skeen, Jim. "Lake Plant Reactivation Considered: District Wants More Power." *Los Angeles Daily News*. April 3, 2001.

[6] Interview with Matt Knudson.

[7] Palmdale Water District. "Municipally-Owned Wind at Palmdale Water District." Poster: 2007.

[8] Interview with Dennis LaMoreaux.

[9] Drake, Julie. "Water District Seeking Ways to Save Costs." *Antelope Valley Press*. February 16, 2002.

[10] Bostwick, Charles. "Power Questions Remain: Water District Seeks More Details on Solar, Wind, and Utility Options." *Los Angeles Daily News*. March 13, 2002.

[11] Unless noted otherwise, quotations are taken from interviews listed at the end of each case study.

[12] Palmdale Water District website <www.palmdalewater.org/OC/AE/solar.html>

[13] In 2003, the goal was accelerated to 20% by 2010 and 33% by 2020. <www.energy.ca.gov/renewables/index.html>

[14] Skeen, Jim. "Answer to Power is Blowin' in the Wind: Edison Rewards Palmdale Facility." *Los Angeles Daily News*. April 19, 2005.

[15] Interview with Dennis LaMoreaux.

[16] Interview with Matt Knudson.

[17] According to LaMoreaux, the city's environmental consultant mistakenly described the proposed wind turbine as "40 feet wide and 300 feet tall" in written materials. LaMoreaux feels that although opponents of the project knew this was a mistake, they still "latched on to" the misleading numbers.

[18] "Water District Board Approves Wind Turbine." *Antelope Valley Press*. October 15, 2003. Downloaded April 29, 2008 from <www.bvaeservices.com/news/articles>

[19] Fausset, Richard. "Palmdale in a Spin Over Windmill Plans." *Los Angeles Times*. February 13, 2004.

[20] Bostwick, Charles. "Water District Plans Windmill: Tower Would Power Treatment Plant." *Los Angeles Daily News*. July 24, 2002.

[21] Bostwick, Charles. "Power Questions Remain: Water District Seeks More Details on Solar, Wind, and Utility Options." *Los Angeles Daily News*. March 13, 2002.

[22] Skeen, Jim. "Wind Turbine Advances: Board Discounts Environmental Impact of New Electricity Generator." *Los Angeles Daily News*. November 14, 2002. Page AV1.

[23] In California, a mitigated Negative Declaration establishes that any potential environmental impacts of a project will be addressed and mitigated through the project design.

[24] Superior Court of the State of California, County of Los Angeles. Petition for Writ of Mandate. Case No. BS080194. Filed December 13, 2002.

[25] Lile, Laurie. Palmdale Director of Planning. Letter to Palmdale Water District. October 23, 2002.

[26] City of Palmdale. Map of Sphere of Influence. <cityofpalmdale.org>

[27] City of Palmdale. *General Plan*. January 25, 1993. Page ER-4. <cityofpalmdale.org>

[28] Skeen, Jim. "Wind Turbine Advances: Board Discounts Environmental Impact of New Electricity Generator." *Los Angeles Daily News*. November 14, 2002. Page AV1.

[29] Superior Court of the State of California, County of Los Angeles. Petition for Writ of Mandate. Case No. BS080194. Filed December 13, 2002.

[30] Skeen, Jim. "City Wins in Windmill Tilt: Judge Indicates He Will Order Environmental Study." *Los Angeles Daily News*. March 19, 2003.

[31] In addition to reducing lighting and clearing vegetation at the base of the tower to avoid attracting birds (and their prey), PWD erected a fence and put in place a bird monitoring program that LaMoreaux says has found no dead birds to date.

[32] "Water District Board Approves Wind Turbine." *Antelope Valley Press*. October 15, 2003. Downloaded April 29, 2008 from <www.bvaeservices.com/news/articles>

[33] Bostwick, Charles. "Wind Turbine Going Up at Lake Palmdale." *Los Angeles Daily News.* May 27, 2004. Page AV1.

[34] City of Palmdale. Community Profile. Downloaded April 27, 2008 from <cityofpalmdale.org>

[35] "Aerospace Valley Regional Economic Information." September, 2001. <www.ecateam.com/Advocacy.htm>

[36] In 2001, the California State Assembly bill listed a full 28 local milestones in aerospace history as it called for the erection of the monument, along with the designation of 60 miles of the Antelope Valley Freeway as the "Aerospace Highway." For more, see Assembly Concurrent Resolutions No. 199 and 120 at www.sen.ca.gov

[37] Superior Court of the State of California, County of Los Angeles. Petition for Writ of Mandate. Case No. BS080194. Filed December 13, 2002.

[38] Fausset, Richard. "Palmdale in a Spin Over Windmill Plans." *Los Angeles Times*. February 13, 2004.

[39] GlobalSecurity.org <www.globalsecurity.org/military/facility/afp-42.htm>

[40] Gatlin, Allison. "Aerospace Giants on War Tech Cutting Edge." *Antelope Valley Press*. April 1, 2003.

[41] Semchuck, Alisha. "Wind Turbine not Aesthetic but Economical." *Antelope Valley Press*. November 26, 2005.

[42] City of Palmdale. *Palmdale News*. Fall 2007 Newsletter.

[43] Palmdale Water District. "Municipally-Owned Wind at Palmdale Water District." Poster: 2007.

[44] Another interviewee described a feeling in the Palmdale community that the City's leadership are "puppet masters" that "make [the Water Board majority] do what they say."

[45] Director Figueroa voted against the measure.

[46] Maeshiro, Karen. "Recall Try Targets 2 in Water District." *Los Angeles Daily News*. January 11, 2008. Valley Edition. Page A4.

[47] Semchuck, Alisha. "Water Manager Resigns his Post." *Antelope Valley Press*. April 3, 2008.

[48] Gipe, Paul. *Wind Power Comes of Age*. New York: John Wiley & Sons, 1995. Page 10.

[49] Gipe. 1995. Page 65.

[50] Bostwick, Charles. "Neighbors Oppose Wind Farm: 400-Foot-Tall Towers Would Spoil Ridgeline, Critics Say." *Los Angeles Daily News*. February 18, 2004.

[51] Skeen, Jim. "Wind Turbine Challenge? Palmdale May Fight Proposal in Court." *Los Angeles Daily News*. December 14, 2002. Page AV1.

[52] Skeen, Jim. "City Wind in Windmill Tilt: Judge Indicates He Will Order Environmental Study." *Los Angeles Daily News*. March 19, 2003.

LACKAWANNA: “Turning in the Right Direction”

Figure A: Driving south on the Hamburg Turnpike in Lackawanna (left), the Mittal Steel complex looms over the houses of Bethlehem Park, with the Bethlehem Steel site to the right side of the image. Along the Skyway south of Buffalo, a few concrete grain elevators are still interspersed among vast expanses of cleared land (right).

“Let me start by saying, I am pro-windmill.” Lackawanna’s Mayor, Norman Polanski, took a seat at the head of his office conference table to explain the positive response that the Steel Winds project has received in his once-thriving industrial city. Polanski, a second-term mayor and former plumber, had recently featured the wind turbines in his successful reelection campaign. The slogan “Lackawanna: Turning in the Right Direction” had been plastered on a billboard and campaign mugs. “Nobody wins in this city by 1,000 votes, but I did.”[1] He spoke like a man who had told versions of the same story before, and in fact I had already read the success story of the project in the New York Times and heard it repeated on FOX News, on the NBC Nightly News, on Al Jazeera. I had just heard the story from the city’s economic development director, who was also seated at the table, and would hear the story the next day from BQ Energy’s project manager: The story of the windmills that turned around the image of a struggling steel town. The windmills that heralded the cleanup of a long-dead brownfield. The windmills that could signal the birth of a new green manufacturing economy for an entire county.

Located on 35 acres of contaminated steel slag on the eastern shore of Lake Erie, the Steel Winds project is an early phase in the ongoing cleanup of the abandoned 1,300-acre Bethlehem Steel plant. Eight giant wind turbines, each 100 feet taller than the Statue of Liberty, started spinning nine months before my visit in April 2007, producing electricity equivalent to the needs of 7,000 homes. Plans to expand the project from 20 megawatts to

65—enough to power 23,000 homes—had been under discussion for months as well.[2] An unexpected sight on the Lackawanna waterfront, the wind farm symbolizes a promising future to many observers. Yet Steel Winds owes its existence as much to the site's industrial history and the mass exodus of Buffalo's industrial capital base as it does to the recent influx of investment by renewable energy developers.

The Lackawanna Iron and Steel Company's decision to relocate from Scranton, Pennsylvania to the shore of Lake Erie was heralded by Buffalo's business community and the local press. At the beginning of the 20th century, as the company began to transform 1000 acres south of Buffalo into a massive city of steelmaking, one particularly glowing media report indicated that "There have been many mythical beginnings for the new Buffalo, but the real, the genuine is finally here."[3] Established as a city in 1909—a virtual company town split off from Buffalo's southern neighbor West Seneca[4]—Lackawanna has seen its fortunes intimately tied to the fortunes of its leading employer. Acquired after World War II by Bethlehem Steel, the plant eventually became one of the world's largest steel plants, and despite a checkered environmental and labor history, the plant brought Lackawanna prosperity and stability. The plant's decline beginning in the 1970s radically changed the image of the City. In 1971, Bethlehem laid off 4,000 and later 5,000 additional workers, cutting its Lackawanna workforce of 18,500 in half. In 1977, Bethlehem cut the plant's employment in half again to 5,000 workers. Finally, in December 1982, the company announced that it would be shutting down nearly all of the plant—and laying off a further 3,900 employees.[5] As Lackawanna Economic Development Director Bill Eagan explains, "Blight set in so quickly." The City's economic fortunes "bottomed out," leaving behind pollution, contamination, and what Eagan calls a sense that "nothing will ever happen."

Figure B: Early view of Lackawanna Steel Company showing the coke ovens, ship canal, and blast furnaces.

The completion of Steel Winds in 2007 was not the first time that Lackawanna's leaders have predicted that outside investment would retool the Bethlehem Steel plant—and

in turn the City's fortunes and image. Twenty years ago, with Bethlehem's workforce reduced to five percent of its previous levels, city economic development officials voiced optimism that the site might be transformed with investment from Silicon Valley computer companies—if only the odor and smoke from the remaining steelmaking operations could be controlled. While a *New York Times* article in 1989 painted the City's high-tech goal as "quixotic,"[6] Lackawanna's leaders hope they are no longer tilting at windmills.

Despite initial skepticism about the effectiveness of an urban wind farm along Lake Erie, the Steel Winds project was eventually supported and championed vigorously by a wide range of local actors—politicians, public servants, renewable energy advocates, businesses, the site's property owner, and the Buffalo media. The former Bethlehem Steel site was technically ideal, had few competing uses, and had an image of industry and contamination that fit well with the prospect of large scale renewable energy. However, as the first phase of the project reached completion, Lackawanna's government took a more cautious approach to the facility's expansion. While the City hopes the wind farm's symbolism will change Lackawanna's image and hopefully attract property developers—and tax dollars—to a vast expanse of land, an expanded project would not necessarily bring further symbolic gains to the City. Although Lackawanna does receive payments for each wind turbine that the project's developer builds, the City sees the incremental gains of future expansion to be less valuable than the sensation of the first eight machines. In the months following the completion of the first phase, competing development priorities and unrelated urban political disputes have slowed the expansion of the project.

Kicking around an idea: 2001 – November 2005

> *Decades of steel-making created this environmental legacy. But that also created the opportunity to take this fallow, contaminated land and reuse it.*[7] – Mark Mitskovski, BQ Energy

The source of the project's initial inspiration varies slightly according to whom one asks. What is clear is that the idea came neither from the neighboring Lackawanna community nor from the eventual developer, BQ Energy, but from the parallel efforts of several advocates in the greater Buffalo area. According to Bill Nowak, Executive Director of Buffalo's Green Gold Development Corporation, the idea of turning a brownfield site into a

wind farm was a "locally initiated" effort. Nowak, who arrived by bicycle to meet with me on a sunny and violently windy day in early January, was a staff member for the Buffalo City Council from 1985 until 2002, and helped to establish Green Gold in 1997 as a collaboration among businesses, the environmental community, and local governments. The mission of the new organization was to "recast the image and the reality of the local economy" and create the "Silicon Valley of Green Business" in Western New York[8], and by 2001 Nowak says the group of 15-20 regular members decided on a wind power demonstration project as the spark that would "get the group off the ground." Nowak also points to a 2001 study[9] performed by urban planning students at the University at Buffalo, which explored potential sites and strategies for locating a wind farm in Greater Buffalo.[10] Among other recommendations, the report recommended the formation of an Action Group to pursue the idea, and just such a group was subsequently formed by Green Gold. According to Nowak, the Wind Action Group, for which he serves as the Communications Chair, has met monthly ever since. While the group's membership was formed of local businesses, wind advocates, and Erie County, eventually several private wind energy developers (including BQ Energy) contacted the group and started attending meetings.

One of the early members of the group, Mark Mitskovski, was the Director of Environment and Planning for Erie County from 2000-2005. Currently the Project Manager of the Steel Winds development for BQ Energy, Mitskovski was instrumental while at the County in initiating and guiding the process in its initial stages. Yet he passes on credit for the idea: "People would come with a technology concept and I would be the one they would throw it at…[The late] Laird Robertson at Ecology and Environment—a multinational environmental consulting firm—was a social community activist gadfly. He drove me nuts. He called me daily saying 'You ought to be looking at wind.' Finally, to be blunt about it, I said 'OK', though relicensing [of the Niagara Power Plant] was my focus." Mitskovski ended up collaborating with Robertson and winning support and matching funds from the New York State Energy Research and Development Authority (NYSERDA) in 2002 to conduct a "very preliminary" review of the local wind resources. The Shoreline Wind Study, released to the public in 2005, confirmed suspicions that the Buffalo area's winds could be harvested to create clean energy, and identified the Bethlehem Steel site as the favored location among five studied.[11] In MItskovski's view, the report "put Western New York on the map" for outside wind developers, who otherwise would not have invested time or resources in the

area: “A dozen companies [some of them European firms] are now running around becoming interested” in the lucrative wind potential of the region.

Despite the acclaim that the Steel Winds project has enjoyed, the idea of turning the Bethlehem Steel site into a wind farm was not immediately embraced. In fact, several of the project’s biggest local boosters expressed skepticism when first presented with the idea of a wind farm on Buffalo’s lakefront. In the summer of 2002, as the Shoreline Wind Study got underway, the editors of the Buffalo News sarcastically commented that there was “nothing intrinsically wrong” with the concept of wind power in Buffalo. Under the caption “More Wind from Erie County,” the editors went on to disparage an experimental federal wind generator that was built on a nearby site 18 years earlier: “OK, maybe technology has improved…It's worth a look, but before anyone starts decorating a redevelopment-targeted [Buffalo] waterfront with dozens of 220-foot towers, with blades reaching up to 330 feet, we ought to consider aesthetics as well as location. And as far as location goes—has anybody considered the inside of City Hall?”[12] Later the same year, the Buffalo News ran another column which expressed amusement with the idea: “The idea of putting a windmill farm on Buffalo's waterfront…made us chuckle, and raise our eyebrows at the same time. Anyone who has walked against downtown's stiff wind knows what we mean.”[13]

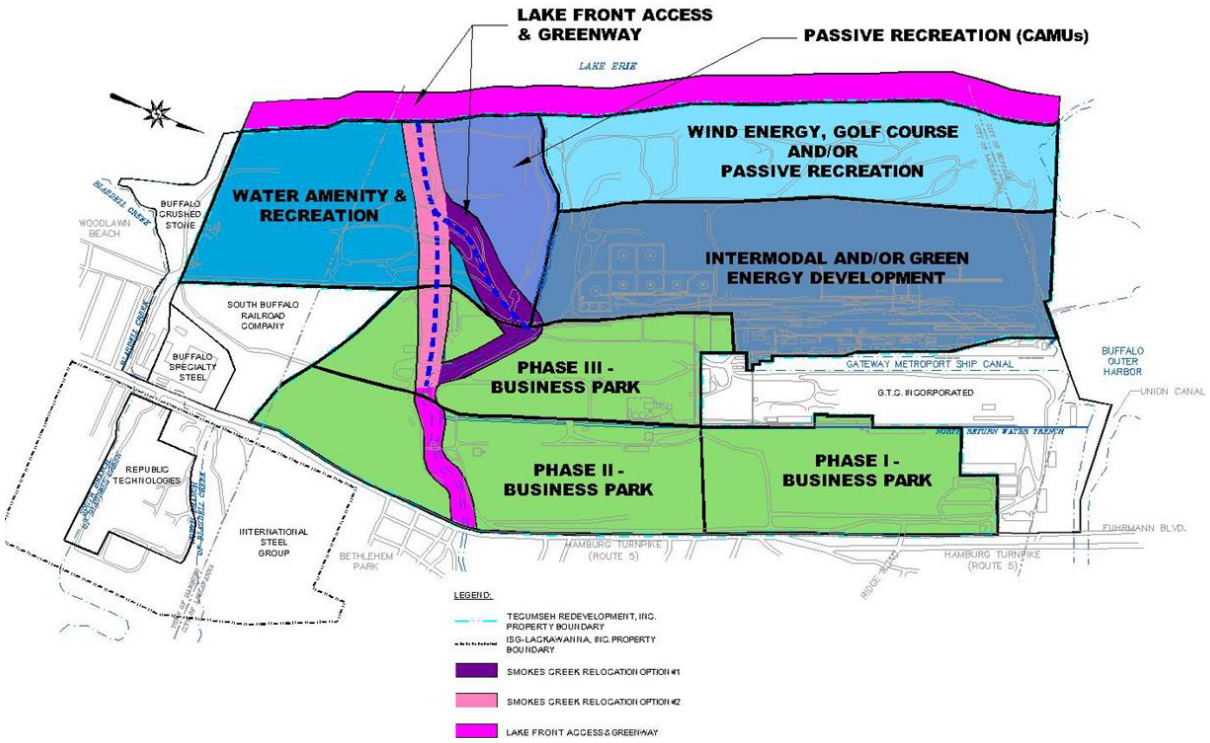


Figure C: Tecumseh Redevelopment, Master plan of Bethehem Steel property, 2005

Meanwhile, Erie County was making overtures to the City of Lackawanna and the owners of the favored site—initially Bethlehem Steel, which was acquired by International Steel Group (ISG) in 2003—in an attempt to get agreement on the cleanup and reuse of the 1,300 acre brownfield site. A memorandum of understanding between the landowner, the County, and the City in April 2005 capped five years of negotiations on the site cleanup. The MOU included tentative endorsement of a master plan for the site that would include wind energy generation and public recreational access to the waterfront as part of a 10-year mixed-use redevelopment effort.[14] According to Mitskovski, when the County first approached Lackawanna, "The city fathers, they thought: 'Wind what?' I'm not sure that Lackawanna embraced us. They embraced us because they saw this as better than nothing…As it has come along, people have seen this as a vehicle for [their own objectives]…Lackawanna did not [at first] adopt this as being their own. It evolved despite them." Mayor Polanki, who was elected to office in late 2003, tells a similar story of his own initial involvement:

> They called me one day and wanted to have a meeting. Paul Curran [Founder of BQ Energy] came in. I had never really known anything about windmills. I thought: windmills? I went out to [Wethersfield] to see the eight windmills. I took a ride with my wife and mother and father, to see how women and older people might feel differently…We heard a gentle 'whisssh.' A car drove by and you could no longer hear it. I said 'What do you think?' They said 'We like 'em.' I could have sat there for hours…I came back and said to Paul Curran 'Count me in. I like it.'

Place matters: The perfect site for an urban wind farm?

Though small by wind industry standards, the Steel Winds project is the largest urban wind farm in North America. Three primary characteristics made the Bethlehem Steel site seem ideal. First, the physical qualities of the site made it technically suitable for wind power development. Second, the site's contamination and lack of developer interest reduced the potential for conflict with other possible uses—at least during the project's initial phase. In Mitskovski's words, "We've put this area on the map. We created value where it didn't exist." Third, the site's low level of "non-use value" to the surrounding community made wind turbines seem compatible in a landscape with a long-standing industrial identity.

From a technical standpoint, the 2005 Shoreline Wind Study established that the site had the greatest wind development potential of five locations considered in the Greater

Buffalo area.[15] Mitskovski explains that Bethlehem Steel site possessed a "whole series of complexities" that were even more complicated than most urban sites. Yet the property's contamination, repeated changes in ownership, unclear tax liability, and multiple federal, state, and local jurisdictional issues were balanced by the brownfield site's positive attributes: existing road infrastructure, the presence of an existing power station and transmission capability, a freshwater port for shipping turbines and equipment, and of course, brownfield tax credits. Yet while tax credits allowed BQ Energy to "overcome obstacles of perception" in terms of the site's complexities, Mitskovski emphasizes that it is the "long-term resource" of the wind that makes or breaks a project. The availability of the wind is confirmed both by the Shoreline Wind Study as well as by anecdotal evidence. As Lackawanna Economic Development Director Bill Eagan describes his two years working at the plant: "When I worked there…When I was a checker…I'd be out two minutes and my moustache would be frozen solid. The wind chill out there is unbelievable."

Just as important as the site's positive technical qualities was the initial absence of conflict with alternative site uses. Unlike the waterfront industrial land across the Buffalo line to the north, the Bethlehem Steel site is not seen as a potential location for housing and mixed-use development, and nobody worries about the potential effects of "industrial" wind turbines blocking lake views from imagined new condominiums.[16] Ken Swanekamp, Director of Business Assistance for Erie County, told me that the "huge spread" of a mile from the nearest residences helped build support for the project's first phase, though a project much closer to residential areas would be a "hard sell." Lackawanna's Bill Eagan concurrs: "We can see the windmills but they're not on top of us." Eagan says Lackawanna would not allow wind development east of Route 5 near Lackawanna's residential areas, but "if [BQ Energy] said they wanted to make this whole area [along the lake] a windfarm, I don't think anyone would mind." This feeling is now starting to change slightly. The second phase of the Steel Winds project reaches further east towards less contaminated land that the City hopes will host commercial development. While the first phase of the project was seen as an "interim" use for land that nobody else wanted,[17] Lackawanna officials are being more careful about the project's expansion.

Finally, it appears that the Lackawanna community was amenable to the use of the site as a wind farm due to what environmental economists would call the site's minimal "non-use value." The community was happy to see the site reused—especially for a project

with a positive image—and saw few negative scenic effects from a wind farm. However, this is not to say that the local community would have welcomed any use of the site with open

Figure D: Aerial view of Steel Winds project from Lake Erie

arms. It is important to distinguish the Steel Winds project from earlier attempts to reuse the same site, which included proposals for a tire burning plant and a medical waste facility. In fact, Lackawanna's Ward 1 Councilor Andrea Haxton described how her start in community activism began shortly after she bought her house near the steel plant in 1988:

> I heard all about a tire burning plant that Mayor Tom Radich wanted to bring in, with 200' smokestacks, and it would burn 2 million tires per year…We were worried about the tires and the fresh water supply… They said the land was so polluted there's nothing else you can do with it. And I said 'No. Let our grandkids decide what goes there. It's a diamond in the city… My girlfriend and I, we picketed the city for an entire year…What are you creating a dump for?…Finally, the tire plant ran out of money and left town.

It has been suggested that areas stigmatized with a history of heavy industry can be expected to show greater support for new development, especially by projects seen as "green."[18] The landscape characteristics and industrial history of the Bethlehem Steel site contribute to the acceptance of the site as a wind farm. It is hard to avoid romanticizing the stark juxtaposition of the gleaming white "Steel Winds" turbines against the dark craggy mountains of steel slag and the crumbling remains of the steel plant's operations.[19] A number of people agree with this aesthetic judgment. Erie County's Industrial Assistance Program Coordinator Chris Pawenski describes the site to me as a "moonscape", complete with craters, and feels the "windmills played into that bluff, which is 60 to 90 feet high." Mayor Polanski thought for a moment before saying, "I think they're a thing of beauty. I could sit there all day and look at them."

A variety of motivations and benefits: December 2005 – Summer 2007

> *Because of the publicity, this has given us a better image. There are half a dozen leading [business] site selection experts throughout the United States…When you hear Buffalo, everyone thinks 'oh, snow'… [Now, people are thinking] maybe I should start looking at Lackawanna."*- Bill Eagan, Lackawanna Economic Development Director

By the end of 2005, Mayor Polanski won unanimous agreement from the City Council for a development agreement he had negotiated with BQ Energy.[20] The deal would pay the City of Lackawanna $100,000 per year for the tax-exempt project, and allow the developer[21] to build eight wind turbines within a narrow strip of steel slag set aside along the lake shore. A separate agreement was worked out between BQ and the landowner. By all accounts, there was little community objection to the proposed project. Following the agreement with the City, Mayor Polanski recounts: "[BQ] moved quickly. We had a public meeting here at the Lackawanna Senior Center and a public meeting in Buffalo City Hall. There was *minimal* opposition at the meeting here. There were 150 people at the meeting in Lackawanna and one person was opposed." Bill Nowak of the Wind Action Group agrees that the city and the developer "got a pro-wind climate…[They] held a public hearing in Lackawanna. We expected it to be loud and rancorous, but 20-30 folks showed up, mostly Lackawanna natives, and [response was] almost entirely positive…[There was] *one* guy, affiliated with a restaurant south of town, who said 'I'm all for wind. Just put it anywhere but here.'" Erie County's Chris Pawenski—who grew up in Lackawanna—took over management of the project at around that time. In his view, "The residents of Lackawanna kind of liked being unique, setting a precedent…Only one person objected, saying 'It will ruin the vista.'"

General acceptance by the Lackawanna community at large was accompanied by flowery rhetoric from the different actors involved in bringing the project to fruition, each of whom expressed a slightly different—though compatible—version of the project's benefits. The developer, advocates, property owner, and overlapping government bodies each expressed unique story lines about the project that emphasized different goals and benefits (both tangible and symbolic).

For BQ Energy, the project is a business opportunity that takes advantage of a site with plentiful wind, available space, and existing infrastructure, and turns a profit by selling

electricity on the energy market. BQ, started by former Texaco project manager Paul Curran, created a business model of developing renewable energy projects at brownfield sites.[22] At Texaco, Curran had built a similar wind farm in 2002 at the Nerefco oil refinery near Rotterdam in the Netherlands. According to Mitskovski, "Paul saw it as a niche market…not necessarily a mega size [project]…There are plenty of brownfield lands and since Paul worked in the oil industry he understood the complexities and felt comfortable with it." BQ's strategy also anticipated that there would be less community opposition to energy development at such sites. In this case, the company's first project, it turns out they were right.

In Mitskovski's view, the project could offer external benefits to the surrounding community as well. "[The] model makes sense…for economic development as well as green power generation," Mitskovski asserts. The potential for the Buffalo region to retool for a new industrial base around clean technologies[23] is the position advocated by Bill Nowak of the Green Gold Development Corporation and the Wind Action Group. With the Steel Winds project under construction, Nowak penned an article in the Buffalo News that called the turbines "highly visible icons that will influence how people see our area for at least the next two decades." He went on to predict that "This could well be the chance we have all been hoping for to redefine the way people see us across the nation, while healing our own self-image in the process."[24] Nowak sees the excitement around wind energy as a strategic point of leverage that the region can use both to attract outside businesses (such as a wind turbine manufacturer) and to build local businesses in the clean energy and energy efficiency sectors. Several months after the Steel Winds project began operation, Nowak wrote another piece for the Buffalo News as a call to action for local governments and economic development groups:

> In spite of the cohesive steps other areas have taken to get ahead of the clean energy curve, the Buffalo metropolitan area has a unique set of assets that give this region an inside track on creating jobs through clean energy. If not taken advantage of quickly and decisively, the opportunity will be wrested from us by more aggressive communities… Steel Winds is the largest urban wind farm in North America. The eight turbines on the old Bethlehem Steel site provide monumental advertising both for our wind resource and for the potential that exists for renewal on our urban waterfront brownfields…For the time being, thanks to progressive political leadership from the City of Lackawanna, Steel Winds gives Western New York a huge leg up in the race to establish our regional identity as a hotbed of green activity… Is the axle of a truck much different from the drive shaft that runs from the blades of a wind turbine to

> the gear box? There may be significant differences, but there is little doubt that the workers at the soon-to-close American Axle plant would be willing and able to bridge that gap.[25]

The motivations of the site's property owners evolved over the years as the symbolic value of the wind power project became apparent and as ownership of the site shifted. During Mitskovski's tenure leading the project at Erie County, "Bethlehem Steel became interested, then went into bankruptcy…We had to start the process all over with ISG. They were convinced, then they sold to Mittal…Everyone was afraid to dig any dirt on this Superfund site, because of liability issues." When ISG acquired the site in 2003, the company seemed more interested in unloading the unused land than in considering future alternative uses. At the time, a spokesman for the Cleveland-based company said: "Our goal is not to sit on surplus property…We're in the steel business, not the land-holding business."[26] Shortly after the wind project's first phase was built, the landowner expressed a different level of enthusiasm. In June 2007, Keith Nagel, director of environmental affairs and real estate at Mittal Steel told reporters, "You've got to think of creative ways to get people to look at these brownfield sites in a favorable light."[27] While walking me around the project site, Mitskovski pointed out how the developers emblazoned each turbine with the logo of one of the project's supporting organizations. "Now that it's there, it's the best thing since sliced bread…We sent a photo [of the logo on the turbine] to Mittal Steel, and within 24 hours they had the photo up on their website. Within 48 hours, the chairman had phoned his US counterparts and said 'I like this. I want more.' This is a first for Mittal Steel."

For Erie County, the project was a big step towards the long-anticipated redevelopment of the massive brownfield. In 2003, Erie County Executive Joel Giambra spearheaded a renewed effort to redevelop the county's numerous brownfield sites, and said the Bethlehem Steel site "would obviously be the icing on the cake for us if we can pull this deal off."[28] In Pawenski's words, "The real benefit from the County's perspective? We've had 1000 acres vacant for 25 years…But this is a waterfront site, a deep water port, an intermodal thruway with CSX [rail] lines…It's drawing developer interest that would never look at Buffalo or Lackawanna." Mitskovski explains that since New York's brownfield cleanup laws require all contaminants to be cleaned to the same level, whether the future use will be industrial or residential, the New York State Department of Environmental Conservation and the County saw the 31-acre windfarm as a good "interim use" for the site's "outer 40."

To the leaders of the City of Lackawanna, the Steel Winds project brought unexpected attention from near and far. "It's changing the image of the City of Lackawanna," Mayor Polanski gushed to the New York Times in the spring of 2007. "We were the old Rust Belt, with all the negatives. Right now, we are progressive and we are leading the way on the waterfront."[29] Recounting how Lackawanna earned the self-mocking nickname "Sunny L.A.", not because of its weather but because of the steel slag that used to illuminate the skies in the dead of night, native son Mitskovski calls Steel Winds an "iconic, image-changing project" that represents "hope, change, and progress – not just for Lackawanna, but for the region." In Mitskovski's memory, the neighbors across Route 5 from the steel plant could not put their clothes outside to dry, because they would quickly turn black. He argues, "This is a community, the entire region, that's had a chip on its shoulder about who they are…This project embodies the hope and future of what the larger community sees. They see this as the icon of what this community can become. Because if you can do it here, you can do it elsewhere… Psychologically, it has had a great benefit to the entire community." Lackawanna's Bill Eagan envisions a time when tourists will be able to access the Steel Winds site from a public access trail that is planned along the lakefront. He sees a natural synergy with the nearby Erie Canal, the Our Lady of Victory Basilica, the (Frederick Law Olmsted) Botanical Gardens, and the city's Carnegie Library.

Eagan agrees that the "real direct benefit" of the project to the City is not the payments from the developer, but the image-changing effects of the wind turbines and the new development that this attention can attract. Eagan claims the Steel Winds project has already spurred the arrival of a new gas station, a coffee shop, a Tim Horton's, a law enforcement weapon facility, and the city's first hotel since the Lackawanna Hotel closed in the late 1970s. "If all of the infrastructure was done, these green areas [points to map] would be completely developed within two years," Eagan predicts. "People are calling all the time…It's given a new life to the City of Lackawanna in terms of the business community *outside* the Buffalo area. When the media calls us, we make the point that they have to talk about these 900 acres…I've got a pharmaceutical company foaming at the bit to get on Route 5."

On the other hand: June 2007 – present

> *… Apparently simple and straightforward is really complex and convoluted. We are initially surprised because we do not begin to appreciate the number of steps involved, the number of participants whose preferences have to be taken into account, the number of separate decisions that are part of what we think of as a single one. Least of all do we appreciate the geometric growth of interdependencies over time where each negotiation involves a number of participants with decisions to make, whose implications ramify over time.* - Pressman and Wildavsky, *Implementation*[30]

Beyond Lackawanna, the Steel Winds project has helped boost the conversation about renewable energy in the Buffalo region. The Town Board of Hamburg (the jurisdiction controlling the southern portion of the Bethlehem Steel site) briefly considered a moratorium on wind power development. However, after a public meeting that featured vocal support from a number of town citizens,[31] the Board passed a commercial wind ordinance in June 2007 that BQ Energy's Mitskovski called "probably the best in the state."[32] Buffalo's Mayor, Byron Brown, announced his intention to staff a new environmental position in City Hall, and among other ideas is reportedly interested in exploring the potential of Buffalo's shoreline for wind power.[33] BQ Energy has received 50% funding from NYSERDA to pursue a "very preliminary" feasibility study to locate wind turbines offshore in Lake Erie.[34] Farther afield on the opposite end of Lake Erie, a coalition of government, foundation, environmental, and business leaders in Cleveland has drawn from Steel Winds' example and begun serious conversations about offshore wind power there.[35] Also in Cleveland, Mittal Steel (owner of the Bethlehem Steel site) has begun exploring the feasibility of wind power on additional properties.[36]

Lackawanna's leaders express guarded support for the idea (floated by several respondents) that wind turbines might eventually be located in Lake Erie. Councilor Haxton told me that "In the water is good…Not close to town" and Bill Eagan admitted "I could see this area seeing windmills in the lake…But not along the Hamburg shoreline further down…[The developers] already have their eyes on [the lake]. They don't want you to know how anxious they are." If one measure of a project's success is the receptivity of the community to embarking on future projects, Steel Winds has a chance at starting something much bigger than itself. Reflecting on the visual impact of the Steel Winds project, Mayor

Polanski said "Cleveland is talking about putting them in the water. There's the possibility of putting them in the water…All right, I'm not opposed to that. It's a thing of beauty. It's the wave of the future."

Yet back on the Bethlehem Steel site, the alignment of interests that led to the Steel Winds project has begun to show signs of strain. Most of the community in Lackawanna seems to welcome an expansion of the facility, though the members of the public that spoke with me informally while I was in town mentioned the project's secondary benefits to local businesses and the city's bottom line, and viewed with a bit of skepticism the fundamental shifts in the city's image touted by city leaders. Discussions continue between the city, the developer, and the landowner, with all parties expressing their support for the process. However, negotiations threaten to break down at the city level due to a multitude of competing interests, expectations, and parallel approval processes. At least three different factors have arisen over time that weigh against the success of the project, though all of them may still be resolved: Growth in skepticism about new technology; the City's competing development priorities; and links to unrelated bargaining and negotiations.

Everyone I spoke with bemoaned the mechanical gear problems that began plaguing the massive turbines several months after they were installed. The project was the first commercial installation of a new line of "Liberty" turbines - manufactured in Iowa by Clipper Wind Power - and flaws in the machinery have resulted in prolonged shutdowns of the facility.[37] On the week in January that I visited, six of the eight turbines were fixed in place, and given the area's previous experience with flawed wind power machinery,[38] the effect is apparently not lost on the surrounding community. According to Nowak: "It's bad news. People start saying 'Here we go again. Buffalo and Western New York have fucked it up.'"

Competing priorities for developing the site also complicate matters. Despite the appeal of renewable energy and the pride the project has brought Lackawanna, the much bigger value the City and County see in the project is the possibility that it can spur further redevelopment. Ward 1 City Councilor Andrea Haxton, who sees herself as the "voice of the people" and wears a studded "#1" pin on her lapel, wants to ensure that any future turbine sites do not impede development. Haxton says, "I envision it to have a Costco or a Sam's Club, a Lowe's, some restaurants, a couple nice strip plazas…There [has] always been talk of a golf course." As negotiations for the project's expansion have gone on, the City of Lackawanna has put pressure on the developer to squeeze the added turbines onto a

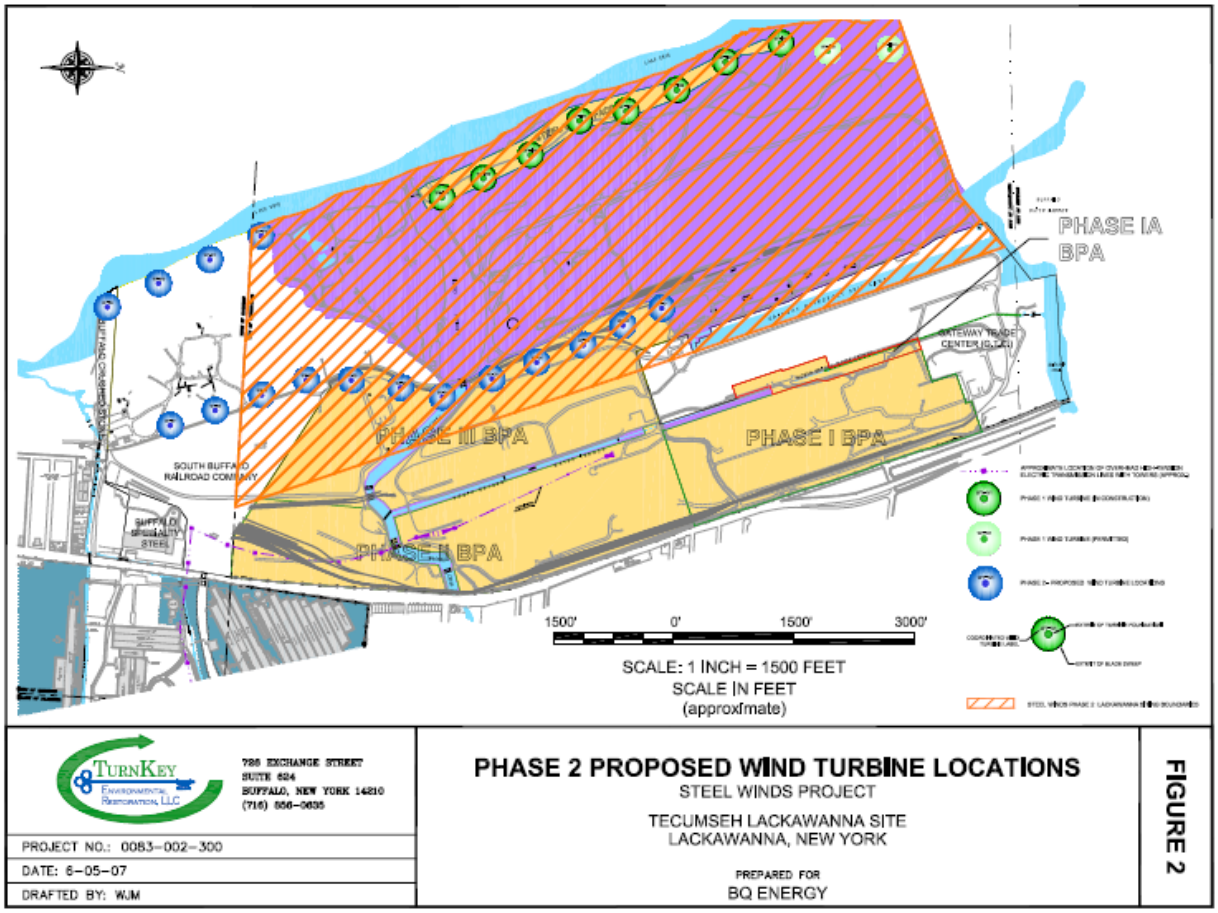


Figure E: Preliminary Site Plan, Steel Winds Phase II, as of June 2007. The eight Phase I turbines are in green.

smaller area of the site than the developer would like. Economic Development Director Bill Eagan is full of enthusiasm for the Steel Winds project, but senses diminished incremental value to the city for an expansion. As Eagan sees the wind turbines, "At first they're cute, but like a puppy, when they grow up they might bite. And you have to feed them…and everything else… Windmills have given value [to the city] because of the contamination. But [the developers] never want to put in just a half dozen." Eagan describes the back-and-forth over the site plan:

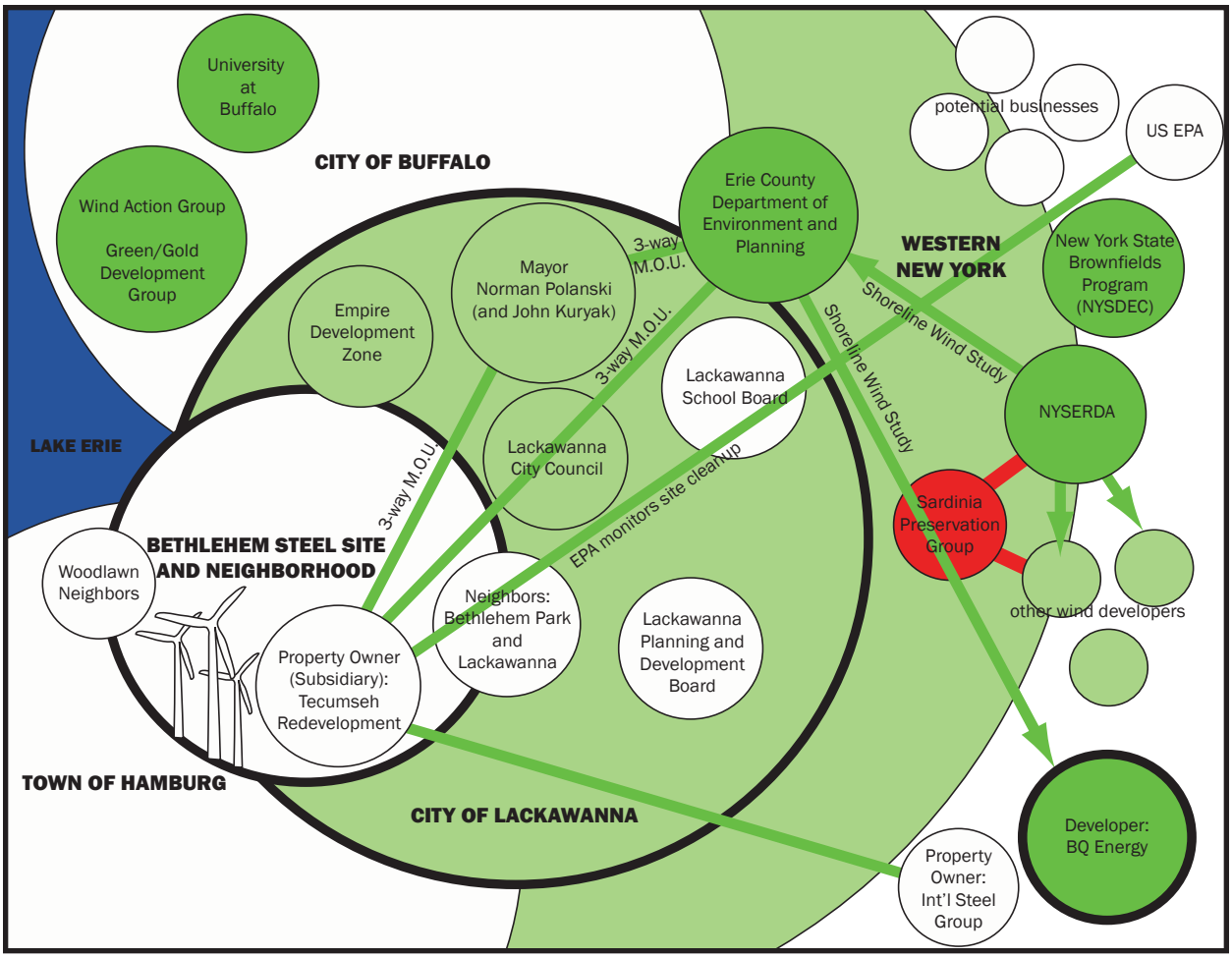
> [BQ Energy] said you could build right next to buildings, but that would corrupt the interest of future uses…The current site is a 30 acre strip, long and narrow. Putting [turbines] in the yellow zone would eliminate 30 acres from that zone…you would have no room for any industry to go in, strategically… They want to put windmills on the yellow [zone of the site plan] because of the brownfield tax credits…They say moving the second line closer would be too close to the first line…They had this map two years ago but did not show it to us. I warned the mayor that it doesn't make sense they would want to do just 10 [turbines].

As other potential uses of the site become more tangible, the City has begun to expect larger economic benefits from any expansion of the wind project. As a renewable energy facility in the State of New York, Steel Winds is exempt from local taxes unless the local government "opts out" of this arrangement. Both the city and BQ Energy agree that the payments negotiated between developer and city in 2005 - $12,500 per turbine per year, or $100,000 for the first eight turbines - were a generous amount for the time. Economic Development Director Eagan says that "When [BQ] first came in, it was like 'Wow, they want to put in windmills." Now, Lackawanna sees other communities demanding thousands of dollars more per turbine and expects to renegotiate the contract terms for the next phase of the project. In Mitskovski's view, however, BQ Energy is being asked to provide unrealistic payments to the city: "People see these $5 million machines and think 'You could give us *anything*.'...But there is a limit...We are being asked for some pretty aggressive fees, far in excess of what is deserving and reasonable." Further, Mitskovski sees the ongoing contract negotiations clouding the planning and zoning review as well as the environmental review process: "This stack of paper is $700,000 worth of work submitted to Lackawanna and Hamburg...stalled by economic payment issues that have nothing to do with [the environmental review]"

Finally, the expansion of the Steel Winds project has become entwined with a variety of linked political issues in Lackawanna that are only somewhat related to the project itself. Mayor Polanski, recalling the political ease of building the project's first phase, explains that the second phase has been much more complicated: "Now the cuckoos have had a chance to organize...I call them the 'antis.'" The most prominent issue deals with the tax assessment of the Steel Winds project. Although in 2005, Mayor Polanski negotiated a payment agreement rather than demanding taxes from the wind developer, no provisions were made at the time for lost revenue to other taxing bodies, primarily the school district.[39] In the view of Councilor Haxton and some others, this was a deliberate strategy. Haxton - who has found herself at odds on a number of issues with her colleagues in the Mayor's office – claims that "They left out the school district...The city did a fast one. The wanted the whole enchilada to themselves." BQ Energy's Mitskovski gives this account:

> We offered the city a payment. The city wrote the language in the agreement that precluded any other entities to levy taxes…We did not understand that was the case…The Mayor chose not to share any of the money with them…Mayor Norm kept all the monies for himself…We have made it clear to the Mayor and have had discussions, that we won't have the same arrangement with him. We don't want to be caught in a fight between the school board and the Mayor….They can split [future payments] however they want it.

In addition to this political dispute, the future of the project has become entangled in separate ongoing disagreements about the tax assessment of the entire Bethlehem Steel property. While not directly a result of the wind power negotiations, the parallel tax negotiations with Mittal Steel (the world's largest steel company and owner of the site since its merger with ISG in 2005) are a flare-up of a century-old struggle. When the Lackawanna Iron and Steel Company decided in 1899 to develop the site south of the Buffalo line, the "municipal limbo" of the property and corresponding freedom from Buffalo's taxes were a key attraction.[40] Since the 1970s, Bethlehem Steel leveled charges of "oppressive taxes" at the City of Lackawanna, and it has been said that the city kept the company's tax assessments "written in pencil" so they could be changed according to the municipal budget needs. At the height of the plant's production, these taxes made up to 60 percent of Lackawanna's tax base, and "tax relief" became the company's "preoccupation."[41] Bethlehem Steel sued the City shortly before its own bankruptcy, and the legal challenge is still in the courts. While Mittal claims that underuse of the site and the costs of cleanup should reduce its tax burden, in late 2007 Mayor Polanski argued "You cannot tell me their property is worth nothing…No judge in their right mind is going to let them walk in and say that."[42] In the view of BQ's Mitskovski, the tax issue has emerged as a much larger fight, but the discussions of expanding the Steel Winds project have become somewhat of a proxy battle: "We are caught in the middle of a fight…We are a leverage point for Lackawanna, or at least they perceive us as such…This is not a significant fight for Mittal, really…[BQ Energy] thought we had environmental issues and permitting issues – those were known risks. This was an unknown risk and has put us in the 'Outer Zone', without any direction, which will probably result in the failure of this project."



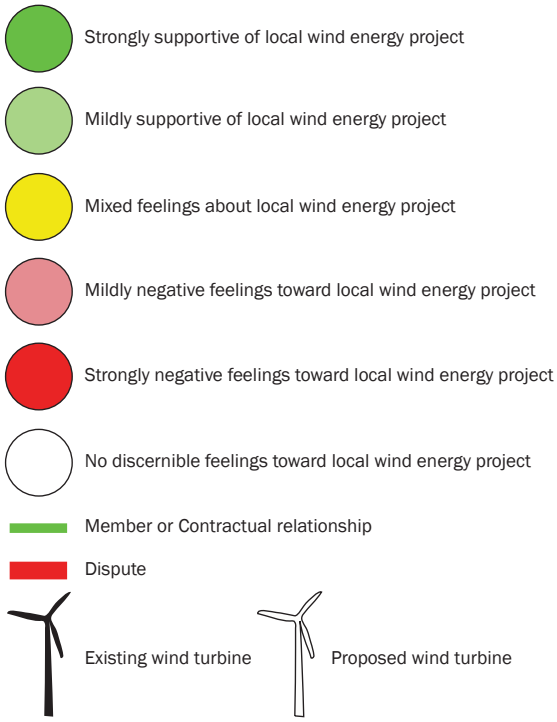
Lackawanna, New York

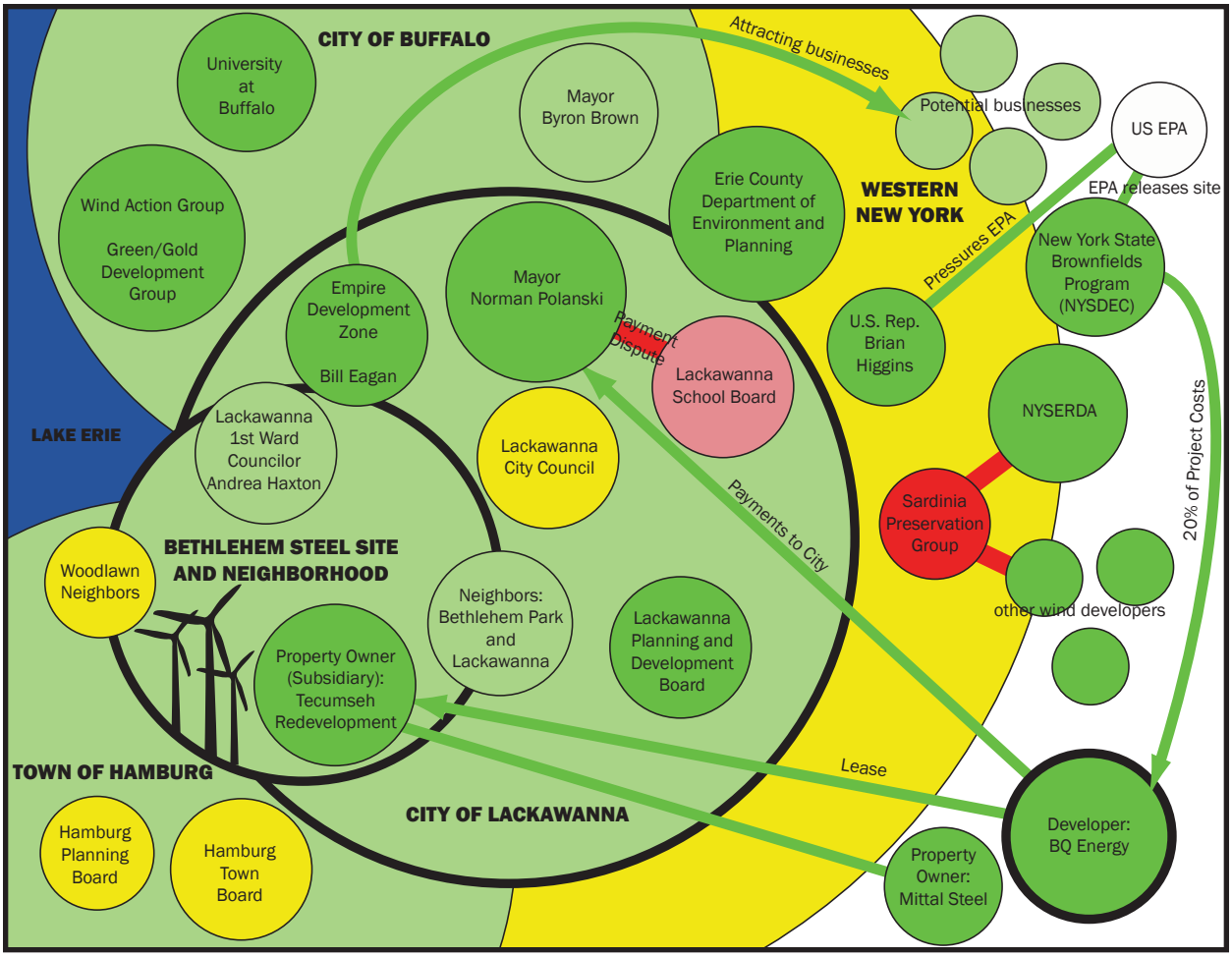
Feasibility and Planning Phase

2001 - November 2005

Discussions of wind power on the Buffalo shoreline among activists, academics at the **University at Buffalo**, and renewable energy advocates coalesced into efforts by the **Wind Action Group** and the **Erie County Department of Environment and Planning**. State funding by **NYSERDA** facilitated a wind study of Buffalo's urban shoreline from 2002-2005, drawing interest by outside developers, primarily **BQ Energy**.

Meanwhile, **Erie County** stepped up discussions about the cleanup of the abandoned Bethlehem Steel site, signing a memorandum of understanding in 2005 with **Lackawanna** and the property owner (**Tecumseh**). A 10-year master plan included a wind farm and public waterfront access.





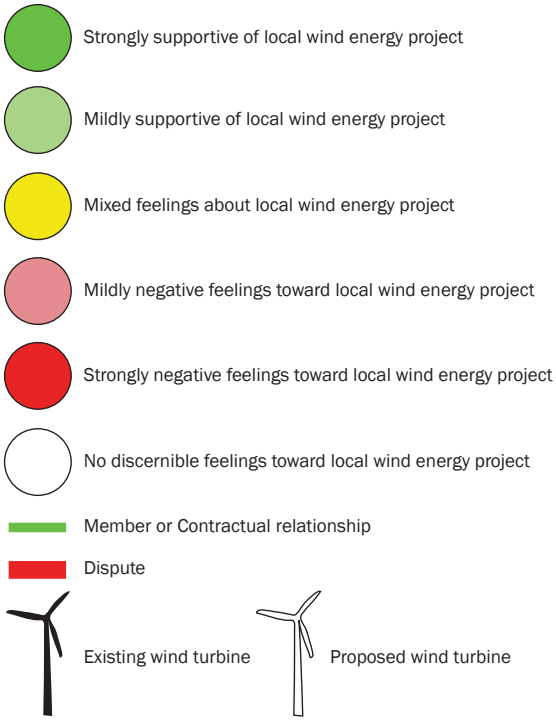
Lackawanna, New York

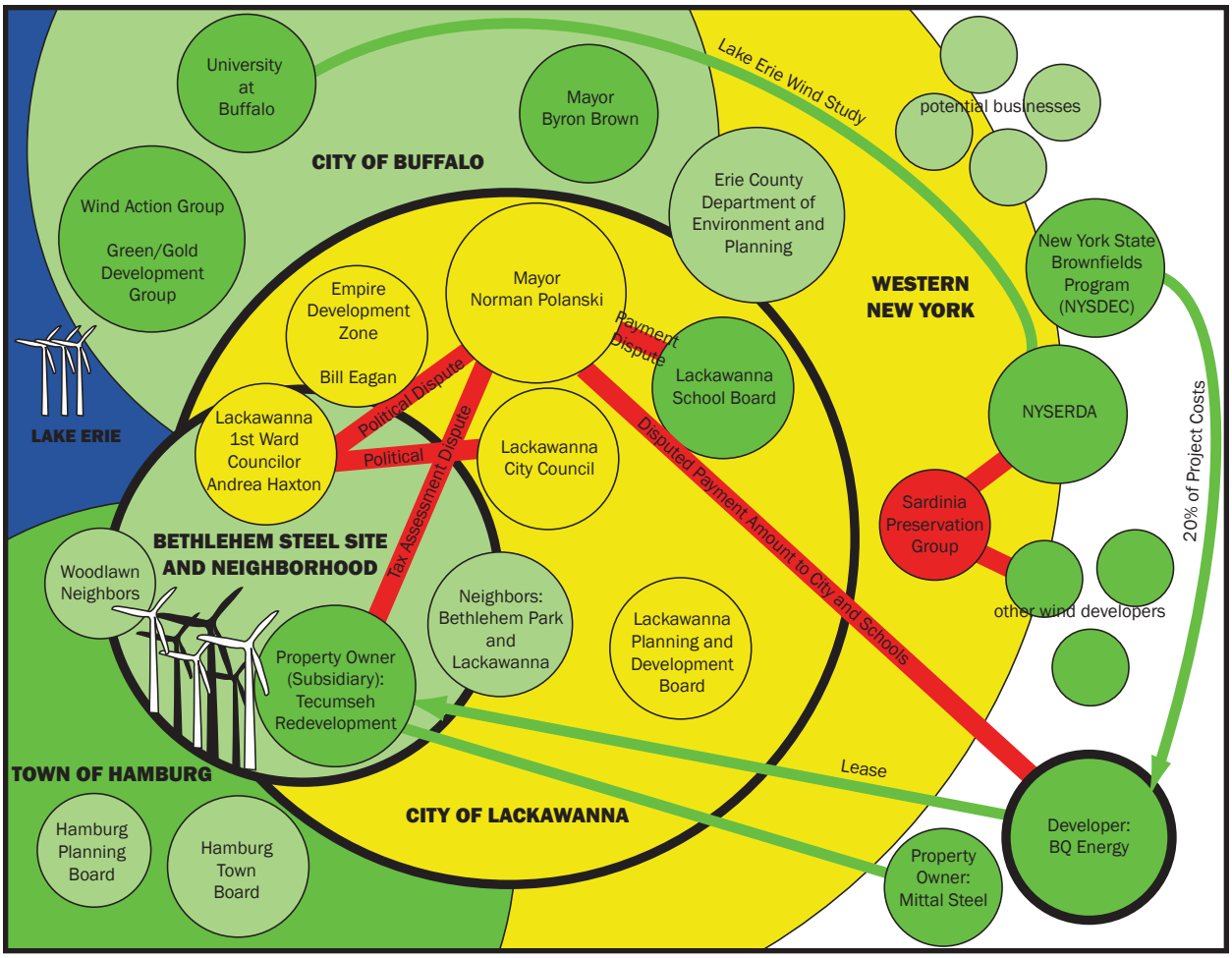
Development and Publicity Phase

November 2005 - Summer 2007

The **Mayor** negotiated a deal with **BQ Energy** that was unanimously approved by the **City Council** in December 2005. While City leaders in Lackawanna were attracted by the promise of payments from the developer, national media attention made the City realize that the positive image of the project could lure new **outside firms**. Tensions arose between the Mayor and **School Board**, which learned the 15-year payment deal with BQ Energy left out the schools.

Wind developers elsewhere in Western New York increased development efforts. Some projects were well-received by local communities, while others resulted in protracted opposition.





Lackawanna, New York

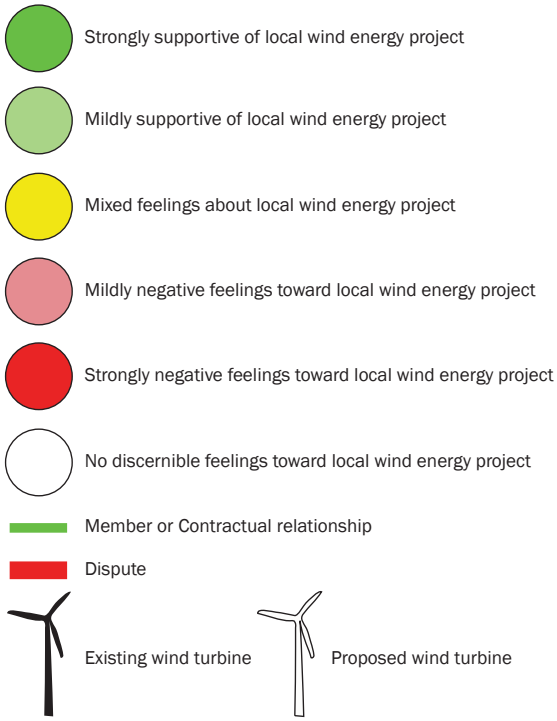
Aftermath and Expansion Phase

June 2007 - present

BQ Energy seeks to expand the Steel Winds project in Lackawanna and neighboring **Hamburg**. Residents and city leaders in Hamburg become supportive of wind power in the portion of the site under their jurisdiction, passing a wind ordinance that is praised by BQ Energy.

While all parties claim to be in support of the expansion, **multiple disagreements** among the actors in Lackawanna (some of them longstanding disputes about other issues) threaten to derail the negotiations at the city level.

The popularity of the Steel Winds project has encouraged others in the city of Buffalo, including the **Mayor**, who announced his interest in exploring wind power.



Interviews

William Eagan, Empire Development Zone Director, City of Lackawanna
January 9, 2008 at Lackawanna City Hall

Andrea Haxton, First Ward Council Member, City of Lackawanna
January 10, 2008 at Rooster's Café, Lackawanna

Mark Mitskovski, Project Manager, BQ Energy
January 10, 2008 at Steel Winds Project, Lackawanna

Bill Nowak, Communications Chair of the Wind Action Group, and Board Member of Green Gold Development Corporation
January 9, 2008 at Towne Restaurant, Buffalo

Christopher Pawenski, Industrial Assistance Program Coordinator, Erie County
January 9, 2008 at Erie County Office Building, Buffalo

Norman Polanski, Jr., Mayor, City of Lackawanna
January 9, 2008 at Lackawanna City Hall

Kenneth Swanekamp, Director of Business Assistance, Erie County
January 9, 2008 at Erie County Office Building, Buffalo

Figure Sources

A. Photographs by author. January, 2008.

B. Photograph courtesy of Frank Rozwood Photo Collection and Lackawanna Local History and Steel Plant Museum <www.steelpltmuseum.org>

C. Tecumseh Redevelopment website <www.tecumsehredevelopment.com> referenced on March 16, 2008.

D. Photograph used with permission of MJ[2] Photography, Buffalo, NY.

E. Preliminary Phase II Site Plan. Courtesy BQ Energy.

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[1] Unless noted otherwise, quotations are taken from interviews listed at the end of each case study.

[2] Using these figures, the expanded project would annually produce more than the electricity consumption of Lackawanna's entire population of 19,000 people.

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SEEING WITH DIFFERENT EYES

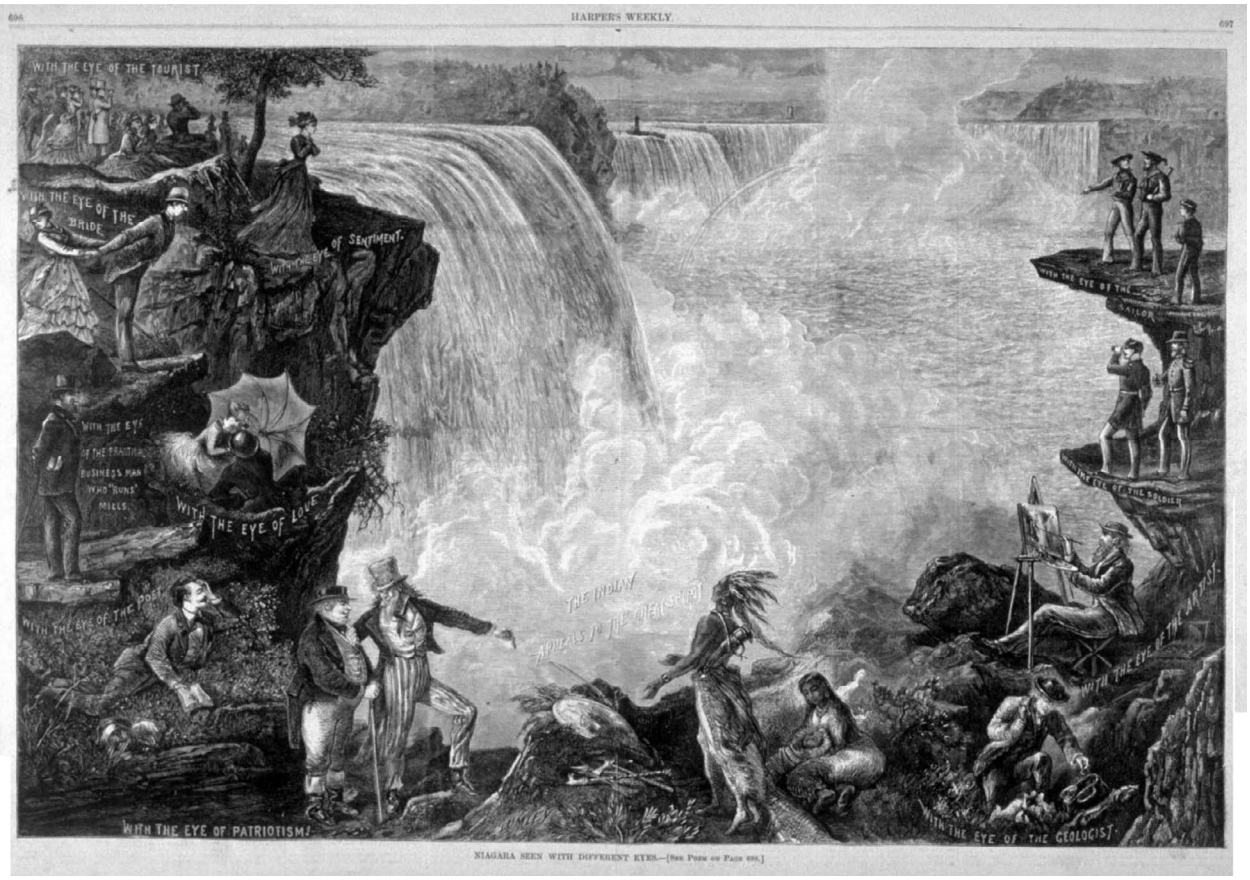

Figure A: Arthur Lumley, "Niagara Seen with Different Eyes," 1873.

Much has been written to explain why high levels of support for wind power at a general level break down in many cases once local sites—primarily rural or offshore—are proposed. Based on this previous scholarship, I expected that if urban wind power proponents chose degraded sites, promoted local ownership, and fostered meaningful public participation in the development process, they could avoid many of the difficulties faced in rural areas. Furthermore, I thought the high levels of support for environmental initiatives in cities, combined with the more cluttered nature of the urban landscape, might make the development of wind power in urban areas relatively uncontroversial. Each of the four projects described above was initiated or supported by a local constituency that expressed strong and attractive motivations for building wind turbines. Project proponents believed that urban wind energy would be embraced—or at least accepted. Yet even in the cities with

strong political and popular excitement about the wind power initiatives, the costs and benefits of specific proposals were seen differently in different segments of the community.

Nearly all of the previous research on wind power siting has presented community acceptance of wind power as a clash of values between "external" forces (national and state energy policies, regional planning regimes, regulatory structures, outside developers) and the expectations of "local" communities. What the urban wind power experiences described here make clear is that value conflicts and competing interests can and do exist within "local" urban communities.[1] In practice, the rich array of urban actors, the intense feelings about urban places, and the highly politicized urban development process elevated the complexity of the projects and their reception in all four cities.

The desire to use new energy technologies as a form of civic boosterism is not new; nor are conflicts between electrical infrastructure and landscape preservation. Before Buffalo had earned the moniker "City of Light" in reference to its early success at electrification, the city played host to the Pan-American Exposition of 1901. At the same time that Lackawanna Steel was transforming 1000 acres south of Buffalo into a "Magic City" of steelmaking, the same group of Buffalo businessmen that had lured the steel company to town were orchestrating construction of the Exposition in North Buffalo.[2] The event's organizers "believed a great future awaited Buffalo because the nearby waters of Niagara Falls had been harnessed to a hydroelectric plant, establishing the world's largest power station…For Buffalo, progress and the future were intimately linked to electrification…"[3] Exhibits throughout the fair celebrated society's conquest over nature and the limitless benefits of electricity, including the "Electric Tower"—a 400-foot high tower that included not just 40,000 electric lights but a 60-foot miniature version of Niagara Falls that erupted from its base.[4] Topping off the tower was the 18-foot-high statue of the "Goddess of Light."[5]

Beauty is truly in the eye of the beholder, and we each frame the world differently depending on our individual values and experiences. As I left Lackawanna in early January, a short drive north on the way to Toronto brought me to Niagara Falls. Tourists from around the world huddled in the cold mist taking pictures, while out of sight the raging currents turned turbines, sending power to high voltage lines that branch out across the region. The 1893 cartoon engraving *Niagara Seen with Different Eyes* (Figure A) depicts a variety of onlookers gazing at the Falls, yet the same vista appears differently, depending on whether

viewed “with the eye of the artist,” “with the eye of the practical businessman who ‘runs’ mills,” or “with the eye of love.” Landscape architect and planner Anne Spirn explains that aesthetic and symbolic views of Niagara Falls can not be separated:

> Niagara has long been, for many, the epitome of the sublime, offering the experience of a powerful natural feature of superhuman scale that inspires awe and fear. To others it has been a spectacle, a source of cheap power, a historic landmark, a livelihood. Niagara has never meant the same thing to everyone, and its meanings have changed over time, reflections of cultural context. The falls and their frame have been repeatedly reconstructed, literally and figuratively, their form and meaning revisited by generation after generation.[6]

The Windy City: Story Lines of Support and Opposition

Like Spirn’s analysis of Niagara Falls, this thesis shows how a number of complex social and political factors shape our opinions about interventions in the urban landscape. In each city, different actors saw the wind turbines themselves in a variety of ways; they also had very different views about proposed sites, project advocates, and planning processes. The multiple proponents in each city saw different benefits from the same projects, but it was the coexistence (rather than alignment) of these distinct story lines that created both the catalyst and support network for each project. While some amount of opposition is to be expected in any sort of urban development project, the level of support for the wind power initiatives in each city depended on the ability of project proponents to create coalitions among actors with diverse interests.

The project advocates in each city advanced a wide variety of motivations to support the idea of urban wind power. In none of the cities was the environmental benefit of clean energy the sole purpose for promoting wind turbines. In fact, with the exception of Toronto—and to a lesser extent Hull—the projects were not advanced primarily for environmental reasons. The promise of significant economic savings drove the Hull Municipal Light Plant (HMLP) to pursue its public wind power initiative. Along with this financial motivation, Hull’s residents felt they were making a positive environmental difference with their wind turbines, and have even developed a bit of a friendly rivalry towards neighboring municipalities. In Toronto, where TREC and WindShare members were strongly motivated by environmental and community objectives, they also hoped to use the turbine’s symbolism to advance renewable energy legislation at the province level. Elected officials and Toronto Hydro

embraced the wind turbine as a way to promote renewable energy as well as symbolize their progress on environmental initiatives. In Lackawanna, the story of the wind farm's transformative effect on the Bethlehem Steel site was adopted by the City and County, which hoped to leverage the project's publicity to attract development—and tax dollars. The Green Gold Development Group initiated discussions about urban wind power as a way to jump start a local conversation about green economic development, and BQ Energy saw the project as a profit-making opportunity. In Palmdale, the Water District pursued its wind power project for economic and power reliability reasons, but also hoped to gain positive publicity in the community. A significant distinction in the Palmdale case is that the Water District had no real success in connecting its interests with the wider interests of the City of Palmdale.

As in many rural wind siting controversies, the urban projects pitted different types of political and environmental interests against each other. Was this "Wind Energy Conversion System" an example of locally-controlled renewable energy, or did it represent total loss of local control over neighborhood development? In one corner sat our champion, a gleaming symbol of our fight against global warming. In the far corner, weighing in at 650 pounds, sat the challenger, a towering industrial "aerial buzz saw" that will hack our native wildlife while destroying our last urban open spaces. Despite the stories crafted in support of the projects, opposition arguments were primarily concerned (as in rural controversies) with a sense of loss as a result of altered community character, ecological disruption, or a lack of control over local development. Opponents in Hull, Toronto, and Palmdale claimed to be in support of wind power, just "not here." The urban residents in these cases felt an attachment to their surroundings—whether "industrial" or "natural"—that was just as strong as the attachment to place found in rural wind farm battles.

Many of the same factors presented in studies of rural wind power acceptance do recur in the urban experiences (See Table 2). However, the cases make clear that understanding community acceptance of wind power in urban areas (and probably outside of cities as well) requires more than evaluating a catalog of individual "factors" specific to the project at hand. In all four cases, the majority of factors—outlined in previous research as pivotal predictors of community acceptance—were seen simultaneously in a positive and negative light by some segment of the local community. A wind turbine in Palmdale was regarded both as a renewable energy generator with a "kind of neat" appearance, and also

		FACTORS IN LOCAL ACCEPTANCE	Hull	Toronto	Palmdale	Lackawanna
Project and Site Characteristics	Visual impact of project	Number of turbines				
		Project Design/Layout				
		Turbine size and color				
		Movement of blades: Sense of effectiveness and maintenance				
	Perception / use of site	Type of Landscape				
		Ownership of the land. Public or private?				
		Will project affect current activities? "USE VALUE"				
		Perception of site "NON-USE VALUE"				
	Location of site	Proximity to neighbors				
		"Annoyance factors": noise, shadow flicker				
		Bird considerations				
"Programmatic Considerations"	Financial benefit (“Distributional justice”)	Direct financial participation of local community members				
		Community/public ownership				
		Local integration of the developer / Sense of local benefit				
	Control of planning and decision-making process	Quality of communication with the public				
		Public Participation in planning / Collaborative decisionmaking				
		Fairness and “procedural justice” in planning				
		Trust in project proponents / Reputation of developer				
		Creation of a local “network of support”				
"Host Community Characteristics"	Community characteristics	Local economy				
		Community self-image				
		Community Homogeneity and Income				
	Community experience	Experience/knowledge of wind power or wind power projects				
		“Social influence processes”: social networks, media, and friends				
		Neighborhood "saturation"				

Table 2

Legend

Factor had POSITIVE effect

Factor had NEGATIVE effect

Differences of opinion about factor's effect

Not a relevant factor in local acceptance

a “monstrosity.” HMLP saw a site in Hull as an old capped landfill, while others considered it part of a sensitive, protected estuary. Some characterized a Toronto wind power cooperative as a local community initiative; others depicted it as a private outside developer. Finally, planning processes seen as open and participatory by project advocates were at times characterized as hasty and predetermined by other community members.

I had predicted that community acceptance would increase if projects targeted less-valued sites, were locally owned, and promoted a meaningful level of public input in the planning process. The cases, however, point to four specific findings that distinguish them from the predominantly rural examples described in previous research:

First, “local” responses to the wind power proposals in these cities were formed simultaneously at two fundamentally different levels: **the neighborhood scale and the city scale**. In all four cases, conflicts arose at some point based on diverging—often symbolic—views of the urban environment across these scales.[7] As Yi-Fu Tuan pointed out in his 1974 rumination on environmental perception, *Topophilia:* “A large city is often known at two levels: one of high abstraction and another of specific experience. At one extreme the city is a symbol or an image (captured in a postcard or a slogan) to which one can orient oneself; at the other it is the intimately experienced neighborhood.”[8] While the wind power initiatives in each city faced a socially and politically complex environment, the most significant differences of opinion in each case occurred between actors operating at the “city” level and actors at specific locations within the city’s neighborhoods.

A second theme that emerges from the cases is that while the use of **degraded and industrial sites** can help facilitate wind power siting, it is not a guarantee of success because the character of even degraded urban places can be interpreted in a variety of ways. The experience in Lackawanna suggests that wind power projects can bring benefits to contaminated and neglected sites. BQ Energy’s strategy of developing brownfield sites was clearly successful in terms of gaining community acceptance for the project. To the extent that the project sparks further cleanup and reuse of the site, there are direct environmental benefits in addition to the rewards of renewable energy. On the other hand, local perceptions of even apparently degraded sites can vary; the wind power advocates in the three other cities proposed projects on land that they considered “industrial,” yet they

received intense pushback from portions of the community. In Toronto, a water filtration plant was also a park, while a sewage treatment plant was part of a protected urban wilderness. In Hull, a sewage treatment plant was also part of a neighborhood, while a landfill was part of a fragile estuary. Development at each of these sites was strongly supported at the city scale, but surrounding neighborhoods resisted. In Palmdale, this process was reversed somewhat. Palmdale's leaders treasured Lake Palmdale for its iconic value as a highly visible gateway to the city, rather than the semi-industrial fringe environment of the water treatment facility.

The third finding is that **local ownership** played only a limited role in determining community acceptance of the proposals. A recurring claim that has gained strong traction in writings on wind power is that "locally owned" projects will gain much greater support at the local level. The degree of community or public ownership did influence the receptivity and opinions of stakeholders in the projects, especially at the overall city scale. Public ownership also played an important part in establishing a favorable legal climate for the projects in Palmdale and Hull. However, the degree of local ownership was perceived very differently at the city scale and at the neighborhood scale, and local ownership by itself did not eliminate siting disputes. In fact, the cases show that even the definition of "local" or "community" ownership is debatable, depending on the frame of reference.

The Lackawanna community did not view private outside ownership as a negative aspect of the Steel Winds project. This is likely related to the site's utilization by private outside industry since the beginning of the 20th century. In Toronto and Hull, local ownership was a key to building a base of support among government leaders and the general public, but there were also perceived inequities between the "community" beneficiaries of the projects and the neighborhood level of impacts. Further, while HMLP was seen as "public" project on the Hull side of the Weir River, it was seen in a much different light by residents of the neighboring town of Hingham. The Palmdale Water District describes its wind turbine as a "community wind project" because the local community has a direct financial stake in its operations,[9] but the PWD was seen to have interests that diverged from the interests of the City of Palmdale itself.

It is interesting to note that the Palmdale Water District (serving roughly 100,000 people), the City of Lackawanna (population 19,000) and the Hull Municipal Light Plant

(serving 11,000 residents) each received approximately the same financial benefit—roughly $100,000 each year—from their initial wind power projects. PWD and HMLP benefit primarily through reduced external power purchases, while Lackawanna, hosting a project that is more than 20 times as large, has a fixed contract with the Steel Winds developer. Hull's second wind turbine has greatly increased these initial savings, and an expanded project in Lackawanna would increase payments, as well.

The final theme is that **political dynamics and development battles** that were largely unrelated to the specific projects strongly influenced communities' receptiveness to proposed wind development. Planning processes that encouraged neighborhood participation and the consideration of multiple sites seemed less important in shaping a feeling of local control than the atmosphere shaped by previous and ongoing development battles. In some cities, the decision-making context was formed partly by previous local experiences with wind energy. In Palmdale, for example, the City reacted to the Water District's project based on its fear that it would be opening the door to large-scale wind farms, which had existed for years in other parts of the Antelope Valley. In the other cases, existing tensions formed by the experience of urban development disputes (unrelated to wind power) reinforced neighborhood responses to the wind power projects. For instance, Friends of the Spit in Toronto saw the need to maintain constant vigilance in the face of perennial development proposals for the Leslie Street Spit. According to the Friends' website, "No other piece of land has attracted such passionate defenders, nor has any other piece of land had such a lengthy battle waged, simply to maintain it and allow it to grow as nature intended."[10] In Hull, it was suggested by several interviewees that a pre-existing lack of trust by Hingham residents towards Hull's government contributed to the negative response to Hull Wind Two. In Lackawanna, a decades-old property tax dispute between a bankrupt steel giant and the City—as well as political maneuvering between the Mayor and the School Board—threatened to derail negotiations over the wind farm expansion. At other times, these unexpected factors could be positive, such as the boost given to the Toronto offshore windfarm plan by the opponents of the proposed Portlands gas power plant.

Going to Scale: Harnessing Power in the Neighborhood Landscape

My purpose in studying the community acceptance of wind turbines in these four cities was not only to understand the development process of discrete projects, but to evaluate whether the groundwork was established for further growth of the wind power initiatives. The turbines' physical prominence has made them symbols of local achievement—and lightning rods for local criticism. The political dynamics that emerged during the planning of these wind turbines will influence whether these demonstration "projects" can be transformed into urban wind power "programs."

Have the cases presented here been winning battles in a losing war? In each case, it seemed at times that the renewable energy advocates leading each development effort had not fully considered lessons from the fields of community development (valuing process and community desires) or urban design (valuing place) that weighed heavily on the success of their projects. As Gordon Walker has pointed out, "If the concerns of those objecting to renewable energy projects are brushed aside, there is therefore the danger that the opposition of interest groups is only intensified, that increasingly negative political responses are made and that a general culture of conflict is manufactured." Ultimately, Walker continues, this can damage public attitudes toward future renewable energy development.[11] Private wind power developers have begun to recognize these issues, which have been well-documented in rural wind siting controversies. Despite a broad base of urban support for renewable energy and potential local economic benefits, "community power" promoters in cities must take the same issues into account.

Increasing the scale of urban wind power efforts will require more than learning how to better site wind turbines. Each project's promoters built a wind project and also achieved some level of symbolic success. However, the wind power advocates in each city varied in the degree to which they were able to extend their single-minded pursuit of erecting a giant machine into a broader vision that linked the parallel motivations of multiple local actors. In addition, the symbolic and tangible benefits of the initial projects seem to have diverging amounts of usefulness for different actors. Further, as projects expand, the benefits of a single project must now face the diminishing future symbolic returns and increasing opportunity costs of larger projects.

In Toronto and Hull, though the city governments and general public are strongly supportive of future wind power efforts, the projects under discussion are away from residential neighborhoods. In Toronto, both TREC and Toronto Hydro have learned that future projects will have to take advantage of economies of scale, while they have also clearly learned from the politicized neighborhood experience of siting the first wind turbine. The Hull Municipal Light Plant has learned similar lessons, and in response to the perceived "neighborhood saturation" factor,[12] has shifted its popular wind power expansion efforts offshore to Hardings Ledge. In Palmdale, the Water District was able to build its wind turbine, but early hopes of building future turbines have been all but dashed by the fallout from its dispute with the city. On the other hand, with ongoing expansion to the massive wind power capacity in nearby Tehachapi and Mojave, the impetus for urban wind power in Palmdale might be less significant than in other regions. Discussions continue about the expansion of the Steel Winds project in Lackawanna and into neighboring Hamburg, though excitement about wind power seems higher among the various actors in Greater Buffalo (the initial project champions and others). Lackawanna's city leaders see the symbolic image-changing benefits of the wind farm in terms of attracting tax dollars from future business development, but have so far expressed little interest in the type of larger green business economic development plan touted by the Green Gold Development Group and others. In fact, they worry about the possible negative effects that an expanded project could have on surrounding property development.

Taking these projects to a scale that has more significant environmental and economic benefits remains a challenge. Technical issues must be overcome in each case to move forward to larger projects, especially in the near-shore water locations in Toronto and Hull. However, based on the experiences in these four cities, I offer a set of suggestions for other cities that hope to implement urban wind power strategies that are both equitable and effective:

First, make sure that "community" wind projects produce **benefits that specifically target the neighborhood**, as well as the city as a whole. The experiences in Hull and Toronto demonstrate that "local" ownership of wind projects will not automatically translate into support at the neighborhood level. Even residents that are supportive of renewable energy and receive some sort of financial benefit might chafe at a project if benefits are equally shared citywide while impacts are concentrated near the wind turbines. The experience in

those cities, however, does suggest that if benefits (financial or symbolic) specifically target neighborhood actors, these could end up being some of a project's strongest supporters.

While neighborhood financial participation in urban wind projects might help reduce a sense of inequity, as the scale of projects increases in the future, direct financial participation could also reduce a sense of ineffectiveness. Some neighborhood actors in Hull and Toronto characterized the initial wind turbines in those cities as symbolic "demonstration" projects with minimal impacts on local air quality or climate change. More than feeling a sense of inequity between neighborhoods, these residents felt they were bearing disproportionate impacts for projects that would have no real tangible benefit. Financial incentives could have been structured so the neighborhoods would actually have been directly rewarded as turbines were installed or as electricity was generated. A wind turbine that generates electricity for "only" 300 residents of a large city might be viewed as a small "demonstration" project in the eyes of those living nearby. The same turbine delivering electricity and direct financial benefits to 300 of its closest neighbors would undoubtedly appear more significant.

Second, advocates of urban wind power should seek to **engage various other actors, rather than merely site individual turbines.** Wind power projects can deliver significant economic benefits to urban communities, and project developers should strategically consider the recipients of these benefits. A focus on equity and involving community groups in project planning, development, and financing could do more than increase support for projects. Mechanisms that create partnerships between developers (including public agencies) and residents—a modified version of WindShare's model—could increase the amount of capital available for renewable energy initiatives and allow public funds to be spread over a greater number of projects. If wind energy projects deliver economic benefits to specific groups or locations, they could actually be used as tools for targeting investment in neighborhoods. Additionally, with a direct stake in projects, pride and a sense of greater self-reliance could develop as a result. These results evolved at a city scale in Hull and Toronto. There is no reason why the same effects could not occur among other groups of participants. By engaging a variety of community groups in the development of a meaningful city-wide wind power initiative, advocates can best ensure the future growth of their efforts. On the other hand, if advocates approach projects as symbolic showpiece machines, they will likely be seen that way.

Third, envision larger-scale projects as **linked urban wind networks, rather than urban wind farms.** Although large industrial sites and near-shore locations can work well for larger-scale wind farms in some places, cities can also follow a networked siting approach. Rather than concentrating wind "farms" on single sites, large wind turbines can be dispersed across an urban area in a way that does not over-saturate any individual neighborhood. As Hull and Toronto's wind projects have shown, large urban wind turbines can be very visible in particular neighborhoods and from certain vantage points, but the same turbines can be virtually unnoticeable a short distance away due to topography and other structures. This flexibility does not exist as much in more open, rural locations.

Where a concentration of wind turbines might lead to neighborhood resistance, a scattered but simultaneous approach to siting turbines could have multiple benefits. Logistically, building turbines at multiple sites would be more complicated, with parallel site investigation, approval, and development processes. However, in situations where concentrating wind turbines at one location is not feasible, bulk purchasing of wind turbines and parallel mobilization of site construction could present significant financial and logistical advantages over a turbine-by-turbine development approach. Additionally, building wind turbines at multiple sites would allow cities to distribute a project's potential benefits to multiple neighborhoods, and combat the perception that any one neighborhood is singled out to bear disproportionate impacts.

In Boston, for instance, a partnership between City Hall and the Boston Public Schools has announced a wind power initiative that will tentatively follow such a networked approach. In early 2008, the City announced its intention to build up to four 250-kW wind turbines to promote renewable energy and act as educational tools at public schools. Releasing a list of six possible sites from Roxbury to Charlestown, the City promised to "embark on an extensive community process to select the best sites to advance these wind power projects."[13] As Boston is proposing, a city planning process should openly prioritize the windiest locations but allow neighborhood feedback that ultimately takes some technically feasible sites off the table. An open process that discusses numerous sites at once is likely to reduce feelings in individual neighborhoods that they are being singled out. TREC and Toronto Hydro initially followed such a strategy in Toronto, attempting to site two or three turbines on Toronto's waterfront. However, this effort was not large enough—or coordinated enough—to be perceived as an equitable and effective approach by local

neighborhoods. Ideally, the City of Boston would consider more than just six sites for turbines, expecting that many possible sites will be eliminated. Even more important than an open process, the right economic incentives might lead neighborhoods to actually feel a sense of competition to attract, rather than repel, wind turbines. A networked approach to urban wind power siting could capitalize on existing social relationships and community based organizations to gather support—and investment—from a broad base of sources. Additionally, opening financial participation in the project to neighborhood residents and families of school children might build a level of support and impact that no renewable energy demonstration by the City could achieve.

Conclusions

For cities and developers that hope to build urban wind power projects of a significant scale, the four stories told here should serve as cautionary tales. A supportive city leadership and high levels of public concern for the environment might have little influence on the siting of large wind turbines. Furthermore, the lessons of rural wind power controversies, while important, will likely be inadequate to eliminate siting disputes in the dense physical and social fabric of the urban landscape. Although wind turbines were successfully built in each case, the potential for future wind power growth is very different in each city.

On the other hand, these cases show that even in urban areas, where at first glance turbulent wind patterns and competition for land make large-scale wind power seem infeasible, there are opportunities for municipalities and creative project developers to make a significant environmental and economic impact.[14] While there will be technical limits to wind power development in any city, wind power initiatives that acknowledge the political complexity of cities—as well as their component neighborhoods—have the best chance at reaching a significant scale. The rich social networks that exist within cities can be seen as mechanisms for implementing wind power projects, rather than obstacles. The strong attachment to place within urban neighborhoods can be more than just a hindrance to new wind power projects. Deeply held values regarding the local landscape can translate into powerful motivations for environmental action.

Figure Sources

A. *Harper's Weekly,* August 9, 1873

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[1] Gordon Walker begins to make this point, though without a specific urban focus. He suggests the frequent presence of both a majority "local passive public" and a minority local "active public" in many renewable energy disputes. See Walker, Gordon. "Renewable Energy and the Public." *Land Use Policy*. 1995. Vol. 12, No. 1, p. 49-59.

[2] Goldman, Mark. *City on the Edge: Buffalo, New York*. Amherst, NY: Prometheus Books, 2007. Pages 16-20.

[3] Nye, David E. *Energizing America: Social Meanings of a New Technology, 1880-1940*. Cambridge: MIT Press, 1990. Pages 41-44.

[4] *Ibid.*

[5] Goldman, 2007. Page 18.

[6] Spirn, Anne Whiston. "Constructing Nature: The Legacy of Frederick Law Olmsted." *Uncommon Ground*. William Cronon, ed. New York: W.W. Norton & Co., 1995. Page 95.

[7] This split-scale dynamic occurred even in Hull, which at 11,000 year-round residents stretches the definition of "urban." Perhaps because of the overlapping scales of neighborhood and town in Hull, and the Town Meeting form of direct government, HMLP and the Town Selectmen were quicker to address neighborhood objections. Multiple interviewees in Hull even described a phenomenon of inter-neighborhood sympathy during the Hull Wind Two siting process, which helped create a consensus against the initially proposed sites.

[8] Tuan, Yi-Fu. *Topophilia: A Study of Environmental Perception, Attitudes, and Values.* New York: Columbia University Press, 1990. Page 224.

[9] Palmdale Water District. "Municipally-Owned Wind at Palmdale Water District." Poster: 2007.

[10] Friends of the Spit website <www.friendsofthespit.ca>

[11] Walker, Gordon. "Renewable Energy and the Public." *Land Use Policy*. 1995. Vol. 12, No. 1, p. 49-59.

[12] Dear, Michael. "Understanding and Overcoming the NIMBY Syndrome." *Journal of the American Planning Association*. Summer 1992. Page 293.

[13] City of Boston. "Mayor Announces Plans for Wind Turbines." Press Release. January 14, 2008.

[14] The expanded projects being considered in Hull and Lackawanna would produce more than the annual electricity needs of each municipality. The offshore windfarm that Toronto Hydro is exploring could provide enough power for up to 70,000 homes.